APPENDIX A





# RECORD OF DECISION
# SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

# JACKSONVILLE ASH SITE
## JACKSONVILLE, DUVAL COUNTY, FLORIDA

**PREPARED BY:**

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA, GEORGIA

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## TABLE OF CONTENTS

Figures

5 9 0007



Tables

5 9 0008

## LIST OF ACRONYMS and ABBREVIATIONS

5 9 .0010

| | |
|---|---|
| ARAR | Applicable or Relevant and Appropriate Regulations |
| ATV | Alternate Toxicity Value |
| BDL | Below the laboratory Detection Limit |
| BHHRA | Baseline Human Health Risk Assessment |
| bls | below land surface |
| bgs | below ground surface |
| CAR | Corrective Action Report |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act of 1980 |
| COC | Contaminant (or Chemical) of Concern |
| COEJ | Community Organized for Environmental Justice |
| COPC | Contaminant of Potential Concern |
| COPEC | Contaminant of Potential Ecological Concern |
| CSF | Carcinogenic Slope Factor |
| cys | *cubic yards (also see* $yd^3$*)* |
| DQO | Data Quality Objectives |
| EPA | United States Environmental Protection Agency |
| EPA-OTS | EPA Region 4 Office of Technical Services |
| EPS | Exposure Pathway Scenarios |
| ERA | Ecological Risk Assessment |
| EPC | Exposure Point Concentration |
| ESD | Explanation of Significant Differences |
| ESI | Expanded Site Inspection |
| ESV | Ecological screening values |
| FDEP | Florida Department of Environmental Protection |
| HEAST | Health Effects Assessment Summary Tables |
| HI | Hazard Index |
| HQ | Hazard Quotient |
| GCTL | Florida Groundwater Cleanup Target Level |
| IRIS | Integrated Risk Information System |
| JEA | Jacksonville Electric Corporation |
| LOAEL | Lowest Observed Adverse Effects Level |
| MCL | Maximum Contaminant Level |
| MEP | Maximum Extent Practicable |
| mg/kg | milligrams per kilogram or parts per million (ppm) |
| NCEA | National Center for Environmental Assessment |
| NCP | National Contingency Plan |
| NOAA | National Oceanic and Atmospheric Administration |
| NOAEL | No Observed Adverse Effects Level |
| NPL | National Priority List |
| OU1 | Operable Unit 1 |
| OU2 | Operable Unit 2 |
| O&M | Operation and Maintenance |
| PA | Preliminary Assessment |

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| | |
|---|---|
| PAH | Polycyclic Aromatic Hydrocarbons |
| PCB | Polychlorinated Biphenyls |
| PCOPEC | Preliminary Contaminant of Potential Ecological Concern |
| ppb | parts per billion |
| PRP | Potentially Responsible Party |
| ppm | parts per million |
| PRG | EPA Region 9 Preliminary Remediation Goals |
| RAO | Remedial Action Objectives |
| RBC | EPA Region 3 Risk Based Concentrations |
| RBCA | Risk Based Corrective Action |
| RCRA | Resource Conservation and Recovery Act |
| RI/FS | Remedial Investigation/Feasibility Study |
| RG | Remedial Goals (i.e., cleanup levels) |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| SARA | Superfund Amendments and Reauthorization Act of 1986 |
| SAS | Superfund Alternative Site |
| SCTL | Florida Soil Cleanup Target Level |
| SDWA | Safe Drinking Water Act |
| SESD | EPA Region 4 Science and Ecosystem Support Division |
| SI | Site Inspection |
| SQL | Sample Quantification Limit |
| SVOCs | Semi-Volatile Organic Compounds |
| TAL | Target Analyte List |
| TAT | Technical Assistance Team |
| TCDD | tetrachlorodibenzodioxin |
| TCL | Target Compound List |
| TCLP | Toxicity Characteristic Leaching Procedure |
| TEQ | Toxicity Equivalence Quotient |
| µg/kg | micrograms per kilogram |
| µg/L | micrograms per Liter |
| US | United States |
| US FWS | United States Fish and Wildlife Service |
| VOCs | Volatile Organic Compounds |
| $yd^3$ | cubic yards |
| XRF | X-ray fluorescence |
| < | less than |

# PART 1: THE DECLARATION

5 9 0012

## 1.1 Site Name and Location

This Record of Decision (ROD) is for the Jacksonville Ash Superfund Site (Site) which includes three separate locations (sites) of former waste processing and/or disposal facilities operated or used by the City of Jacksonville, Florida. EPA grouped the three locations under one site designation because they have common sources and types of waste and to ensure consistency in the approach to site investigation and cleanup. Included are two former city incinerators at Forest Street and at 5th and Cleveland and a former dump site that is now occupied by Lonnie C. Miller, Sr. Park. All three sites are in the northwest portion of Jacksonville in Duval County, Florida. The U.S. Environmental Protection Agency (EPA) Site Identification Number is FLSFN0407002.

## 1.2 Statement of Basis and Purpose

This decision document presents the Selected Remedy for the Jacksonville Ash Superfund Alternative Site (the "Site"), which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for the Site. In accordance with 40 CFR §300.435, as the support agency, the Florida Department of Environmental Protection (FDEP) has been offered the opportunity to provide input during this process. FDEP does not object to the selected remedy.

## 1.3 Assessment of Site

The response action selected in this ROD is necessary to protect the public health or welfare and the environment from actual or threatened releases of hazardous substances to the environment.

## 1.4 Description of Selected Remedy

The overall cleanup strategy for this Site is to prevent the human and ecological exposure to contaminated soil by excavation, soil covers and institutional controls. The major components for the Selected Remedy include:

- ❑ Prevention of human exposure to surface soil contaminated above Remedial Goals (i.e., cleanup levels) is provided by soil removal as needed to allow for installation of a 2 foot thick soil cover. In residential areas the selected remedy will consist of the removal of any contamination above the remedial goals (RGs) in the upper 2 feet of soil to be followed by backfill with a soil cover as needed to provide two feet of uncontaminated soil.
- ❑ Temporary Relocation will be provided to eligible residents upon their request.
- ❑ Excavation will be followed by restoration activities (e.g., backfilling with clean soil, replacement of flower beds, trees, shrubs, grass, etc.).

- Stabilization of the banks of McCoy's Creek, Ribault River and Hogan Creek (e.g., clear banks, excavate soil to achieve acceptable side slopes, dispose of excavated soil/material properly, installation of erosion controls to prevent erosion of ash/contamination into creek, etc.).
- Place geotextile (or other membrane) topped with gravel under residential houses with open crawlspaces (that can be accessed by children) with exceedences of human health RGs to further prevent direct contact with the soil
- Institute groundwater monitoring to verify the "No Action" decision for the groundwater
- Solidification/stabilization of excavated soil exceeding the limits of Toxicity Characterization Leaching Procedures (TCLP). An estimated 36,300 cubic yards of excavated soil/ash will need to be solidified/stabilized pursuant to the RCRA treatment standard requirements at 40 CFR § 268 prior to disposal at an appropriate Subtitle D Landfill.
- Imposition of institutional controls to control exposure to remaining soil contamination above the RGs below 2 feet, under the soil cover and under buildings, roads, driveways, sidewalks, asphalt or concrete which maintain a break in the exposure pathway. Where contamination will remain at depth below two feet a marker such as snow fencing will be used to indicate its presence.

### 1.5 Statutory Determinations

The Selected Remedy is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years from construction completion. The objective of these five year reviews will be to confirm that the remedy is, or will be, protective of human health and the environment. If found to be unprotective, then corrective actions to bring the remedy to a protectiveness level will be taken.

The contaminated soils at the Site are not considered to be "principal threat wastes" because the constituents of concern (COCs) are not found at highly toxic concentrations that pose a significant risk to either human or ecological receptors, and the contaminated soil can be reliably contained. However, the selected remedy satisfies the statutory preference for treatment as a principal element of the remedy because a small percentage of the excavated soil contains hazardous characteristics requiring it to be considered a RCRA hazardous waste and in need of treatment pursuant to RCRA treatment standard requirements at 40 CFR § 268.

### 1.6 Data Certification Checklist

The following information is further discussed in the Parts 3 through 9 of the Record of Decision. Additional information can be found in the Administrative Record file for this Site.

- ✔ COCs and their respective concentrations
- ✔ Baseline risks represented by the COC
- ✔ Remedial Goals (i.e., cleanup levels) established for COCs and the basis for these levels
- ✔ How source materials constituting principal threats are addressed
- ✔ Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the Baseline Risk Assessment and ROD
- ✔ Potential land and groundwater use that will be available at the site as a result of the Selected Remedy
- ✔ Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected
- ✔ Key factor(s) that led to selecting the remedy (i.e. describe how the Selected Remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision)

## 1.7 Authorizing Signatures

8/24/06

Beverly H. Banister, Acting Director
Waste Management Division

Date

## PART 2: INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

### 2.1 Site Name, Location, and Brief Description

This Record of Decision (ROD) is for the Jacksonville Ash Superfund Site (Site) which includes three separate locations (sites) of former waste processing and/or disposal facilities operated or used by the City of Jacksonville, Florida. EPA grouped the three locations under one site designation because they have common sources and types of waste and to ensure consistency in the approach to site investigation and cleanup. Included are former city incinerators located at Forest Street and at 5th and Cleveland and a former dump site that is now occupied by Lonnie C. Miller, Sr. Park. All three sites are in the northwest portion of Jacksonville in Duval County, Florida (See Figure 1). The U.S. Environmental Protection Agency (EPA) Site Identification Number is FLSFN0407002. EPA is the lead agency for this Site.

#### 2.1.1 Forest Street Incinerator

The former Forest Street incinerator site occupies approximately 27 acres in an area of mixed residential and industrial land use, approximately one mile west of Jacksonville's central business district. The site is located at latitude 30°19'35" north and longitude 81°40'58" west. The City of Jacksonville operated the Forest Street municipal incinerator from the 1910s until the 1960s. Although some of the ash waste was taken to other dump sites for disposal, a considerable amount was apparently deposited at and near the incinerator. The incinerator ash contains several COCs, but the main drivers for the cleanup are lead, arsenic, polycyclic aromatic hydrocarbons (PAHs) and dioxin.

The former incinerator area is now enclosed by a chain link fence to prevent access. The site also includes adjoining land used or potentially affected by waste handling or ash disposal activities, including the present location of the Forest Park Head Start School on the west portion of the site, a city park facility in the south portion of the site and surrounding residential properties (see Figure 2).

#### 2.1.2 5th and Cleveland Incinerator

The City of Jacksonville operated another municipal incinerator from the 1910s to the 1960s in an area just north of the intersection of 5th and Cleveland streets, approximately one mile northwest of downtown Jacksonville. The site is located at latitude 30°20'37" north and longitude 81°40'14" west. The approximately 36 acre site includes the former incinerator location and other areas impacted by the ash. The incinerator ash contains several COCs, but the main drivers for the cleanup are lead, arsenic, PAHs and dioxin.

Portions of the site are now occupied by the Emmett C. Reed Community Center, a pool, playground, and picnic areas, and city baseball diamond and basketball courts. Ash, containing glass and metal fragments was disposed in several areas near the incinerator, including the present location of the park and baseball field, next to the community center, and along the east side of Francis Street. Ash is also found in some of the residential areas surrounding the former incinerator site (see Figure 3).

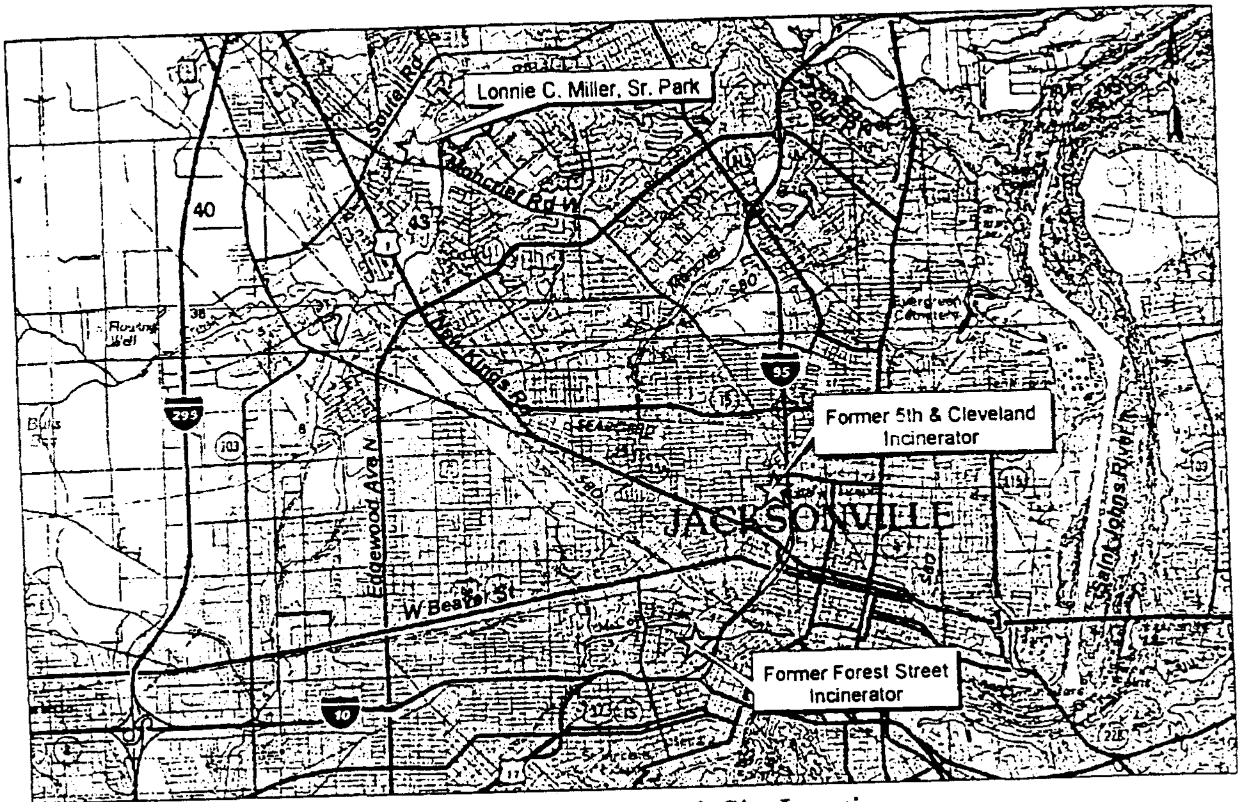



Figure 1 - Jacksonville Ash Site Locations

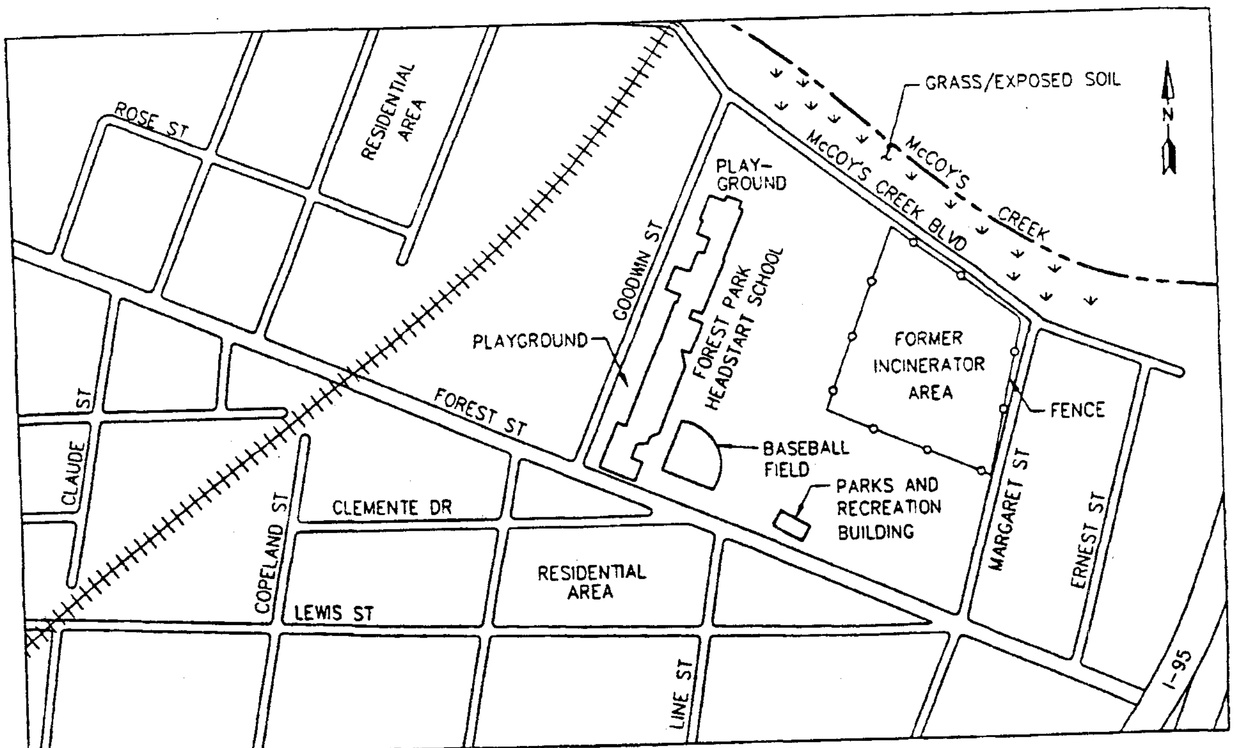



Figure 2 - Former Forest Street Incinerator Site Detail

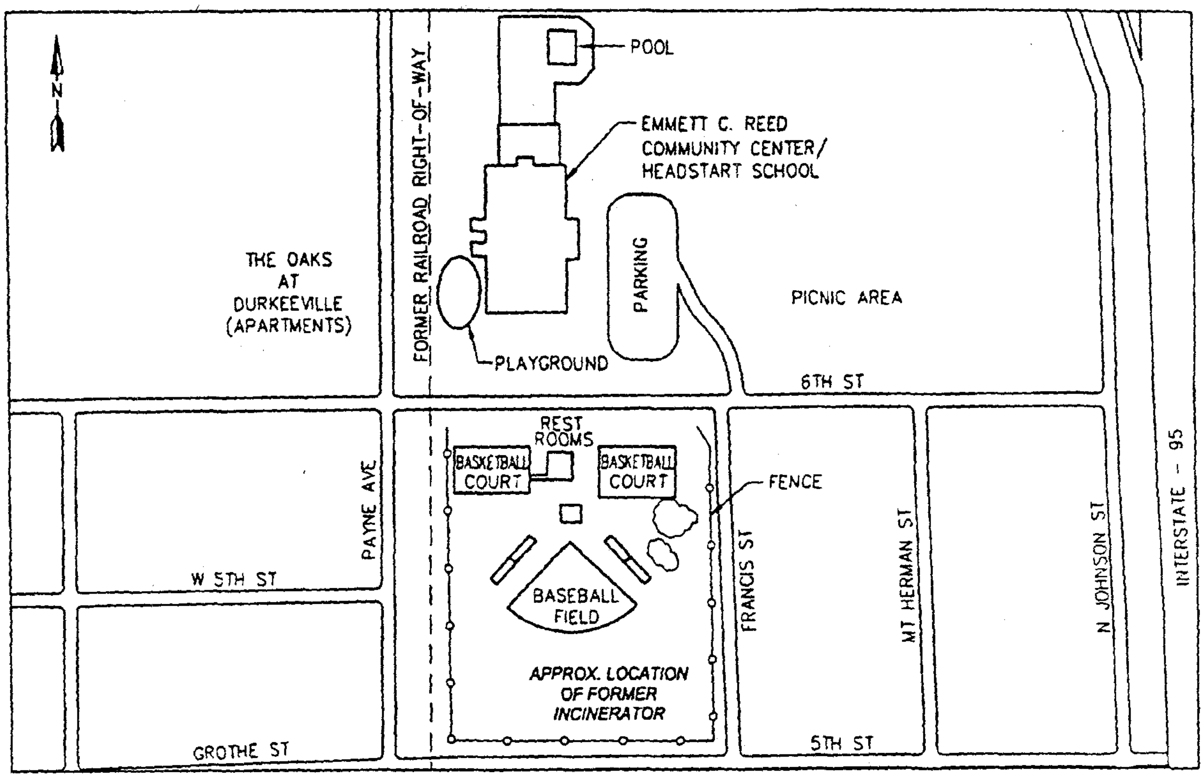



Figure 3 - Former 5th and Cleveland Incinerator Site Detail

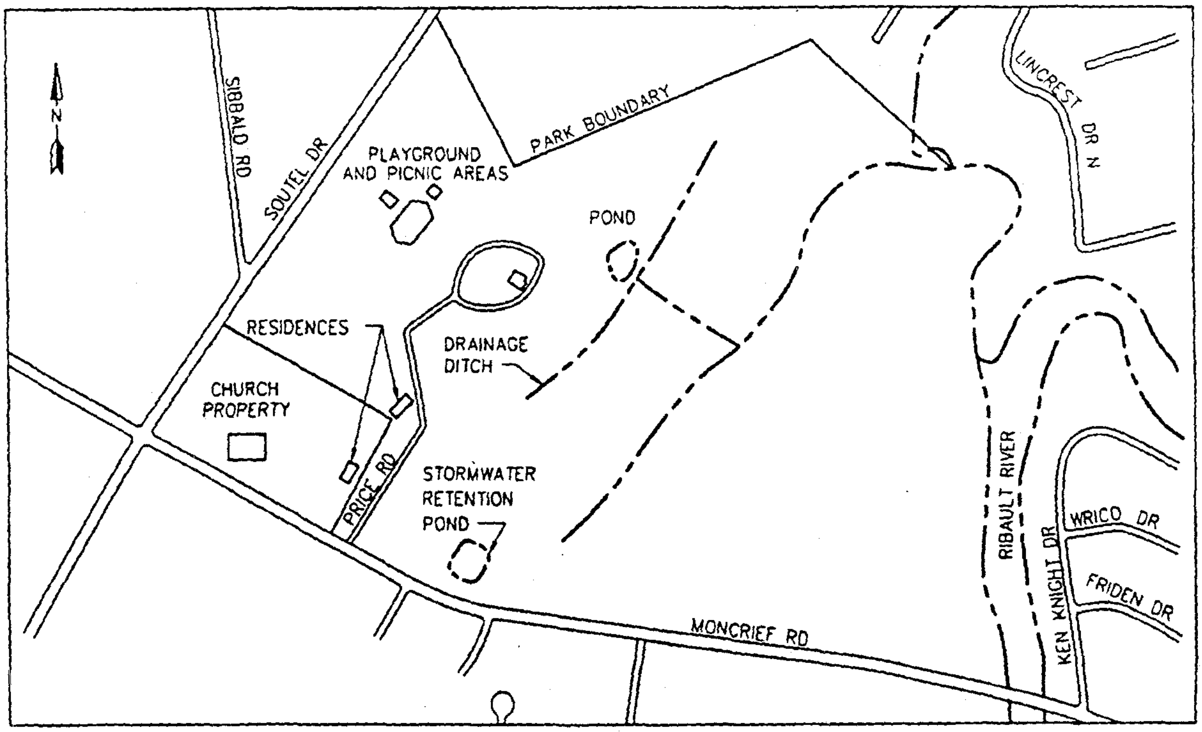



Figure 4 - Lonnie C. Miller, Sr. Park Site Detail

### 2.1.3 Lonnie C. Miller, Sr. Park

Lonnie C. Miller, Sr. Park is located northeast of the intersection of Moncrief Road and Soutel Drive, approximately five miles northwest of downtown Jacksonville. The approximately 108 acre site is located at latitude 30°23'30" north and longitude 81°43'32" west. From the 1940s to the 1960s, the owners operated a dump on a portion of the land, which was formerly used for agricultural purposes. The City of Jacksonville disposed of incinerator ash waste, and other parties reportedly disposed of septic sludge and other wastes at the dump site. The incinerator ash contains several COCs but the main drivers for the cleanup are lead, arsenic, PAHs and dioxin.

In the late 1980s, the City of Jacksonville purchased a large portion of the privately owned land to develop a regional park. The park includes a picnic shelter, playground, and walking areas. The Ribault River borders the east side of the park, flowing northeast to the Trout River (see Figure 4).

## 2.2 Site History and Enforcement Activities (Activities that lead to current problem)

The City of Jacksonville operated the Forest Street and 5th & Cleveland municipal incinerators from the 1910s until the 1960s. The resulting incinerator ash contains lead and other inorganic constituents such as arsenic. The burning process also generated organic constituents such as polyaromatic hydrocarbons (PAHs) and dioxin. Although a considerable amount of the incinerator ash was disposed of in dump sites such as Lonnie C. Miller, Sr., Park and Brown's Dump (a separate Superfund Alternative Site with similar ash contamination), a considerable amount of ash was disposed of around the former incinerators including the spread of ash contamination into surrounding residential properties.

In May 1999, EPA sent Special Notice Letters to the City of Jacksonville identifying them as a Potentially Responsible Parties (PRP) to the Jacksonville Ash site. The City was asked to voluntarily enter into an Administrative Order by Consent (AOC) with EPA to perform a Remedial Investigation and Feasibility Study (RI/FS) for the Jacksonville Ash Site. The City of Jacksonville agreed, and the Order was signed and work began September 1, 1999. Therefore, this Site was never listed on the National Priorities List (NPL); rather, it is a Superfund Alternative Site (SAS) which, pursuant to the 1999 AOC, is consistent with the National Contingency Plan (NCP) for the required RI/FS. Site remediation is to be funded by the City of Jacksonville. The lead agency for this Site is the EPA.

## 2.3 Previous Investigations

What became the Jacksonville Ash Site has been investigated as separate sites several times over the years. The following is a summary of key involvement by EPA, the Florida Department of Environmental Protection (FDEP) and the Agency for Toxic Substances and Disease Registry (ATSDR) before the RI/FS was started. ATSDR has continued to make health assessments after the start of the RI/FS as new RI data was collected and evaluated.

### 2.3.1 Preliminary Assessments, 1994-1996

In the Fall of 1996, The Florida Department of Environmental Protection (FDEP) conducted Preliminary Assessments (PAs) at the 5th & Cleveland Incinerator, Forest Street Incinerator, and Lonnie C. Miller, Sr. Park, respectively. All three assessments concluded that the soil exposure pathways at each site were of major concern due to the presence of ash material, its unknown extent at the sites, and historical data that indicates elevated heavy metals (including lead and arsenic) are present in municipal incinerator ash. The 5th & Cleveland Incinerator, Forest Street Incinerator, and the Lonnie C. Miller, Sr. Park sites were recommended for further CERCLA action. Details of these assessments and other State investigations are in the following:

- Preliminary Contamination Assessment Report (CAR), Forest Street Incinerator, November 3, 1994, RSDI Environmental, Inc.
- Contamination Assessment Report Summary (CAR), Forest Street Incinerator, November 20, 1995, Dominion Environmental Geosciences
- Forest Street Incinerator Site: Soil Data, June 10, 1996, Dominion Environmental Geosciences
- Preliminary Assessment Report 5th & Cleveland Incinerator, October 31, 1996 (FDEP)
- Preliminary Assessment Report, Forest Street Incinerator, November 26, 1996 (FDEP)
- Preliminary Assessment Report, Lonnie C. Miller, Sr., Park, December 24, 1996 (FDEP)

After a February 1996 site visit at the 5th & Cleveland site, FDEP requested that the City of Jacksonville implement interim measures to cover exposed areas of ash and ash-contaminated soil with gravel, compost or sod. The interim cover was implemented at 5th & Cleveland site by time of the submittal of the October 31, 1996, Preliminary Assessment Report.

The site discovery forms for the Forest Street and 5th & Cleveland Incinerator sites were sent to EPA on September 29, 1996. The Lonnie C. Miller, Sr. Park site discovery was December 18, 1996.

### 2.3.2 Site Inspection Reports, 1997

In 1997, EPA conducted a series of sampling events, analyzing for metals, organics, pesticides/PCBs, and dioxins in soils, surface water, sediments and groundwater at each of the three sites. Three separate Site Inspection (SI) Reports were completed in December 1997 that presented the results and conclusions.

- Site Inspection Report, 5th & Cleveland Incinerator, December 1, 1997 (EPA)
- Site Inspection Report, Forest Street Incinerator, December 1, 1997 (EPA)
- Site Inspection Report, Lonnie C. Miller, Sr., Park, December 31, 1997 (EPA)

For each of the three sites the soil exposure pathways are of major concern because of the direct exposure risk to elevated levels of lead and arsenic. The groundwater migration pathway is of possible concern at all three sites due to the detection of elevated levels of inorganic constituents in the surficial aquifer. The surface water migration pathway is of possible concern at the Forest Street Incinerator and Lonnie C. Miller, Sr. Park sites because of elevated levels of arsenic and lead detected in sediment samples from McCoy's Creek and Ribault River. All three sites were recommended for further CERCLA action.

### 2.3.3 ATSDR Health Consultations, 1996-2003

In November 1996, EPA requested the Agency for Toxic Substances and Disease Registry (ATSDR) to perform a Health Consultation for the 5th & Cleveland Incinerator site using existing data to evaluate the potential for health effects in children from exposure to lead in the soils. It concluded that the limited sampling and analyses that were conducted show that lead is present at levels of public health concern; however, the sampling is not adequate to characterize the nature and extent of contamination. ATSDR also concluded that the temporary measures implemented at the site (covering the ash with gravel, sod and compost) are effective in minimizing potential exposures to contaminants in the ash, though not considered to be protective in the long-term. ATSDR recommended that the temporary measures be adequately maintained to minimize potential exposure, until the nature and extent of contamination has been characterized and permanent remedial actions are implemented.

In January 1997, EPA requested ATSDR to perform a Health Consultation for the Forest Street Incinerator site. It concluded that the site is a public health hazard and long-term incidental soil ingestion by children or adult trespassers on the most contaminated part of the site (the northeast quadrant where the former incinerator was located) could interfere with proper blood formation. It also concluded that the concentrations of the other metals found in the soil are not a public health hazard. ATSDR recommended that access be restricted to the area where the former incinerator had been. They also recommended that the surface soils be sampled for complex organic chemicals (including PAHs and PCBs) and that the vegetables grown in the contaminated soils be tested.

In September, 1999, ATSDR performed a Health Consultation for Lonnie C. Miller, Sr. Park. ATSDR found no apparent public health hazard based on available data. ATSDR recommended additional sampling to supplement existing data.

In December, 1999, ATSDR performed a Health Consultation for 5th & Cleveland site. ATSDR found that concentrations of lead and antimony in one soil sample that are a public health hazard. ATSDR recommended maintaining the soil and grass cover in this area and additional sampling to fully characterize the site.

In May, 2001, ATSDR performed a Health Consultation for Lonnie C. Miller, Sr. Park using the latest data from the Phase I RI sampling. ATSDR concluded that there is no immediate health threat because of the distribution of ash contamination, visitor activity patterns, the presence of a heavy vegetation cover at the park, and the blood lead levels collected from children by the Duval County Department of Health that indicate few exceedences of the CDC guidelines for safe blood lead levels. ATSDR recommended the development of a long term remediation strategy, restricting access to lead concentrations over 1,000 mg/kg, and maintaining the vegetation cover in areas of contamination. Based on this health consultation, EPA requested the installation of a fence to separate the highest contamination in the eastern portion of the park from the western portion where most visitor activity takes place. The City of Jacksonville erected the fence restricting access to the highest levels of contamination at the park.

In January, 2002, ATSDR performed a Health Consultation for the 5th & Cleveland site using the latest data from the Phase I RI sampling. ATSDR concluded that the levels of lead pose a long term threat public health threat if children frequently come in contact with the contaminated soil. They further concluded that the interim measures to restrict exposure to the contamination for lead greater than 1,000 mg/kg (covering the ash with gravel, sod and compost) and lead greater than 400 mg/kg (vegetation cover) are effective in preventing short term health threats and these interim measures should be maintained. The Health Consultation also referenced the blood lead levels measured by the Duval County Department of Health that indicate few exceedences of the CDC guidelines for safe blood lead levels.

In January, 2002, ATSDR performed a Health Consultation for the Forest Street site using the latest data from the Phase I RI sampling. ATSDR concluded that the levels of lead pose a long term threat public health threat if children frequently come in contact with the contaminated soil. They further concluded that the interim measures to restrict exposure to the contamination for lead greater than 1,000 mg/kg (covering the ash with gravel, sod and compost) and lead greater than 400 mg/kg (vegetation cover) are effective in preventing short term health threats and these interim measures should be maintained. The Health Consultation also referenced the blood lead levels measured by the Duval County Department of Health that indicate few exceedences of the CDC guidelines for safe blood lead levels.

In the Fall of 2002, ATSDR evaluated the analytical data for health hazards in the playground and picnic area of Lonnie C. Miller, Sr., Park. The Health Consultation dated October 8, 2002, states that there is no health hazard in the area of the park that is outside the temporary fence separating the contaminated eastern section of the park.

In September, 2003, ATSDR performed a Health Consultation for the 5th & Cleveland site to evaluation the health hazard from eating vegetables grown in the ash contamination at all three sites. The data for the evaluation was collected by EPA in January, 2002, from three gardens at the 5th & Cleveland site with varying concentration of lead, other metals and PAHs. ATSDR concluded that the levels of metals and PAHs in the collard and mustard greens (the vegetables evaluated) are not likely to cause illness and present no apparent public health hazard. An unacceptable long term health risk was possible from direct exposure to lead in the soil above EPA's recommended residential clean up goal of 400 mg/kg. ATSDR recommended that gardeners in the area use good gardening and food preparation practices (wash hands and food) to minimize exposure to garden soil.

## 2.4 Implementation History of Remedial Investigation (RI), Baseline Human Health Risk Assessment, Ecological Risk Assessment, Feasibility Study

### 2.4.1 RI Phase I, 1999 - 2000

With the signing of an AOC in September 1999, the City of Jacksonville agreed to perform of a Remedial Investigation/Feasibility Study (RI/FS). The goal of the RI is to determine the nature and extent of contamination at the Site. In 1999 the City of Jacksonville submitted a Work Plan which contains the sampling strategy, methods and goals. After review by EPA, FDEP and Technical Assistance Plan (TAP) community group, the final Work Plan was approved by EPA in April, 2000. An RI/FS Kickoff public meeting was held on May 1, 2000. The RI Work Plan was implemented in summer, 2000. The draft RI Report presenting the results of the Phase I sampling was submitted in November, 2000. After review by EPA, FDEP and the TAP community group, EPA requested additional parcel-by-parcel RI sampling on January 17, 2001 to determine the need for remediation on a parcel-by-parcel basis.

### 2.4.2 RI Phase II, 2001 - 2003

The City of Jacksonville agreed to conduct the additional parcel-by-parcel RI sampling in June, 2001. After review by EPA, FDEP and the TAP community group, EPA approved the additional RI sampling Work Plan in September, 2001. Additional RI sampling started in October 2001.

The sampling took longer than expected due to difficulties in getting signed Access Agreements. On two occasions (September/December 2001), the City mailed Access Agreements to properties targeted for the additional soil sampling. The first mailing went to the mailing address of the property targeted for sampling. The second mailing went to the owner/occupant at the physical address of the property. The second request from the City was followed by a December 2001 EPA Fact Sheet on the Access Agreement.

In May 2002, the EPA walked through the neighborhood talking to residents who had not returned previous requests for access, asking for access and answering the community's questions on the Access Agreements and the importance of the additional sampling. The City of Jacksonville also sent people door-to-door seeking access.

In March 2002, U.S. Congresswoman Corrine Brown sent a letter to individuals who had not signed the Access Agreements. Representative Brown's letter encouraged people to sign the Access Agreement so sampling could take place to determine if incinerator ash and contaminated soil are present.

At properties where access was granted, Phase II soil sampling was carried out. With an acceptable number of parcels sampled in early 2002, the following major actions occurred:

- EPA called for the November 2000 draft Remedial Investigation Report to be rewritten to include the information collected during Phase II. The Remedial Investigation Report was revised and EPA approved the final version (Revision 2) dated December, 2004.
- EPA approved the Human Health Baseline Risk Assessments.
- EPA approved the Ecological Risk Assessments.
- Additional background dioxin sampling was performed in late 2002 and early 2003.
- Additional groundwater sampling was performed in early 2003.

The December, 2004 RI Report was approved. The RI allows the following conclusions to be drawn:

- Soil is contaminated at levels of concern at all three sites.
- Sediment is contaminated at McCoy's Creek at Forest Street Incinerator and Ribault River at Lonnie C. Miller, Sr. Park. However, because constituents of concern

concentrations are at levels similar to sediment background concentrations upstream from the sites, active remediation is not needed.

- Groundwater is not contaminated at levels of concern at any of the three sites.
- Surface water is not contaminated at levels of concern at any of the three sites

### 2.4.3 Baseline Human Health Risk Assessment (BHHRA), 1999-2003

The Baseline Human Health Risk Assessment was performed by an EPA contractor under an RI/FS Work Assignment. The BHHRAs with the following dates were approved by EPA:

- 5th & Cleveland Incinerator, September 27, 2002
- Forest Street Incinerator, March, 2003
- Lonnie C. Miller, Sr. Park, March, 2003.

These documents conclude that unacceptable risk exists in soil and groundwater for COCs. The COCs are the contaminants that the BHHRAs have determined present a possible risk to human health. These risks are well defined and there are no additional assessments required to develop remedial goals (RGs) for the identified COCs. The Baseline Risk Assessment allows the following conclusions to be drawn:

- Soil is contaminated at levels supportive of cleanup at all three sites.
- Groundwater is contaminated at levels of concern at all three sites, although subsequent sampling during the RI has shown that groundwater is not contaminated at levels that are a threat to human health.
- Surface water is not contaminated at levels of concern at any of the three sites

The risks are discussed in more detail in Part 5 of this ROD.

### 2.4.4 Ecological Risk Assessment, 1999-2003

The Ecological Risk Assessments (ERAs) were performed by an EPA contractor, under an RI/FS Work Assignment. The ERAs with the following dates were approved by EPA:

- 5th & Cleveland, March 31, 2003
- Forest Street Incinerator, March 31, 2003
- Lonnie C. Miller, Sr. Park, September 12, 2003

These documents conclude that surface water does not contain ecologically significant concentrations of contamination and is therefore not considered to be a medium of ecological concern at the site. However, concentrations of contaminants of potential ecological concern (COPEC) in surface soil present a risk to terrestrial communities (land dwelling animals) at all three sites. COPECs in sediment present a possible risk to aquatic communities (water dwelling animals) and viable insectivore (insect eating) and piscivore (fish eating) communities at all three sites, if significantly higher than background sediments concentrations from upstream. These risks are well defined and there are no additional ecological evaluations or assessments required to develop preliminary remedial goals (PRGs) for these contaminated media. PRGs are conservative constituent concentrations developed in the ERA that present a possible threat to the environment. Additional biological studies could be conducted to determine site specific cleanup goals by refining the conservative PRGs in the ERA.

The risks are discussed in more detail in Part 6 of the ROD.

### 2.4.5 Feasibility Study, 2004 - 2005

With the finalization of the Risk Assessments and completion of Phases I and II of the Remedial Investigation (i.e., with the sampling of a significant number of targeted parcels), the next step in the cleanup agreement with the City is performance of the Feasibility Study.

The following is a listing of the main events which have occurred with regard to the Feasibility Study:

- Feasibility Study (revision 0) was submitted in November 2004 and reviewed
- Feasibility Study (revision 1) was submitted in May 2005 and approved in July 2005

The FS findings are discussed in more detail in Part 7 and 8 of the ROD.

### 2.4.6 RI Phase III, 2003 - 2005

It was recognized that several provisions of Florida's risk based corrective action (RBCA) statute (F.S. §376.30701), enacted on June 20, 2003, would impact Superfund cleanups conducted in Florida. Impacts from this law (along with a desire to collect information needed for quicker implementation of the cleanup) necessitate an additional round of sampling at certain parcels (i.e., Phase III).

Phase III sampling actions are to occur concurrent with selection of the cleanup approach and remedial design/remedial action activities. Exceedances of applicable RGs delineated during the Phase III sampling will be included for remediation.

## 2.5 Enforcement Activities

In May 1999, EPA sent Special Notice Letters to the City of Jacksonville identifying them as a Potentially Responsible Parties (PRP) to the Jacksonville Ash site. The City was asked to voluntarily enter into an AOC with EPA to perform a Remedial Investigation and Feasibility Study (RI/FS) for the Jacksonville Ash Site. The City of Jacksonville agreed, and the Order was signed and work began September 1, 1999. Therefore, this Site was never listed on the National Priorities List (NPL); rather, it is a Superfund Alternative Site (SAS) which, pursuant to the 1999 AOC, is consistent with the National Contingency Plan (NCP) for the required remedial investigation/feasibility study. Site remediation is to be funded by the City of Jacksonville. The lead agency for this Site is the EPA.

## 2.6 Scope and Role of Operable Unit and Other Response Actions

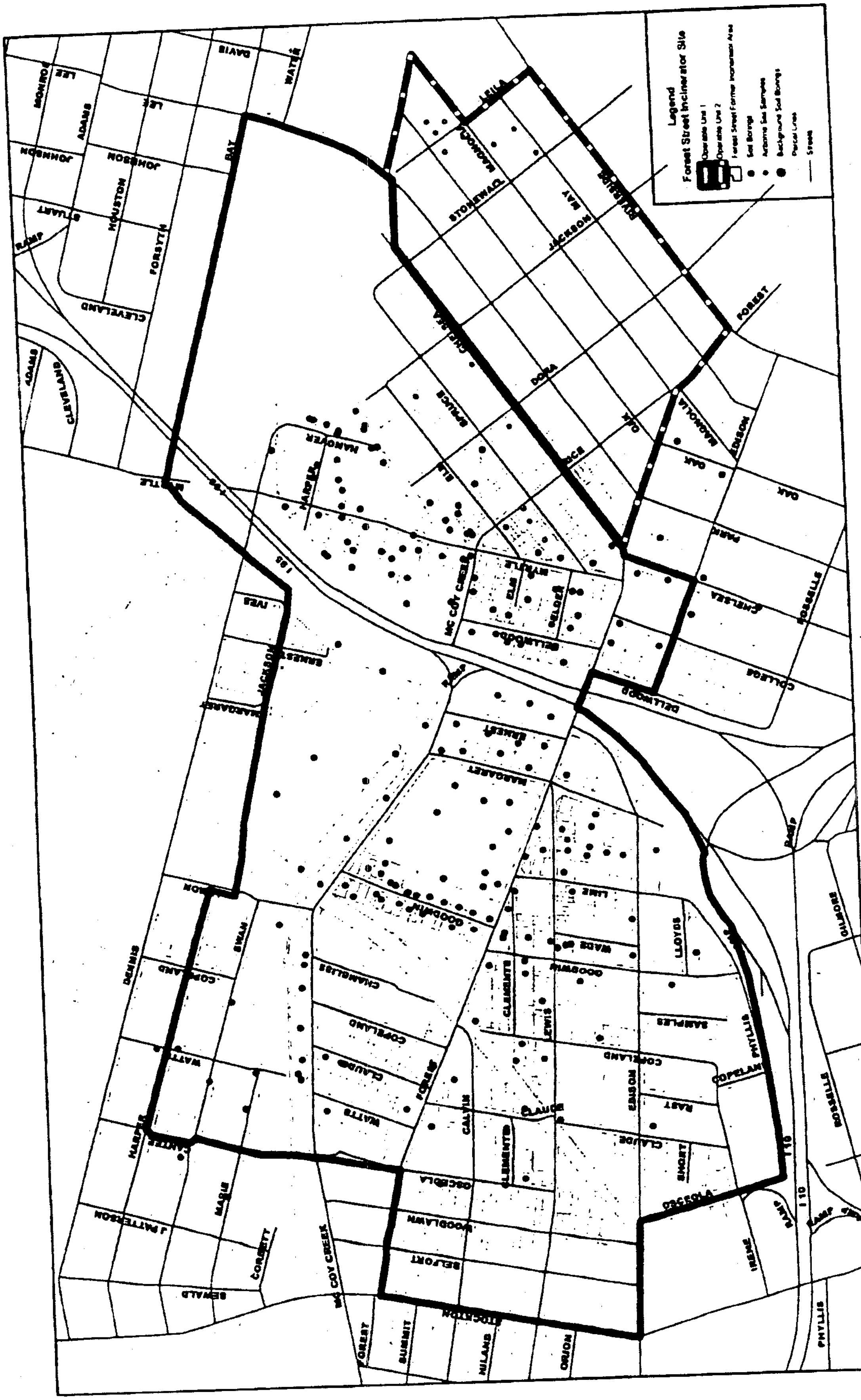
The remediation of the Jacksonville Ash Site is presented in this Record of Decision (ROD). There are two operable units at the Forest Street Incinerator site and 5th & Cleveland Incinerator site of the Jacksonville Ash Site. The remedy and remedial goals presented in this ROD will be effective for both operable units. The area included in Operable Unit 1 (OU1) is presented in the Remedial Investigation Report dated December 2004 and Feasibility Study dated May 2005 (see Figures 5 and 6). The size of OU1 may change somewhat after Phase III RI sampling is completed. The Lonnie C. Miller, Sr. Park site has only one operable unit.

During sampling for air-borne contaminants, small areas of ash were found in the sampling areas located approximately 3000 feet to the east of the Forest Street and 5th & Cleveland Incinerator sites. The air-borne soil sampling did not indicate wide spread lead contamination, but small areas where ash was dumped. It was decided that these areas did not represent a high risk and that sampling and remediation of the main sites immediately around the incinerators were of higher priority. The soils to be sampled and evaluated for remediation that are located east of Hogan's Creek (5th & Cleveland) and east of Chelsea Street (Forest Street) are considered Operable Unit 2 (OU2). Any other work needed to complete the investigation and remediation of the Jacksonville Ash Site will also be included in OU 2 (see Figures 5 and 6).

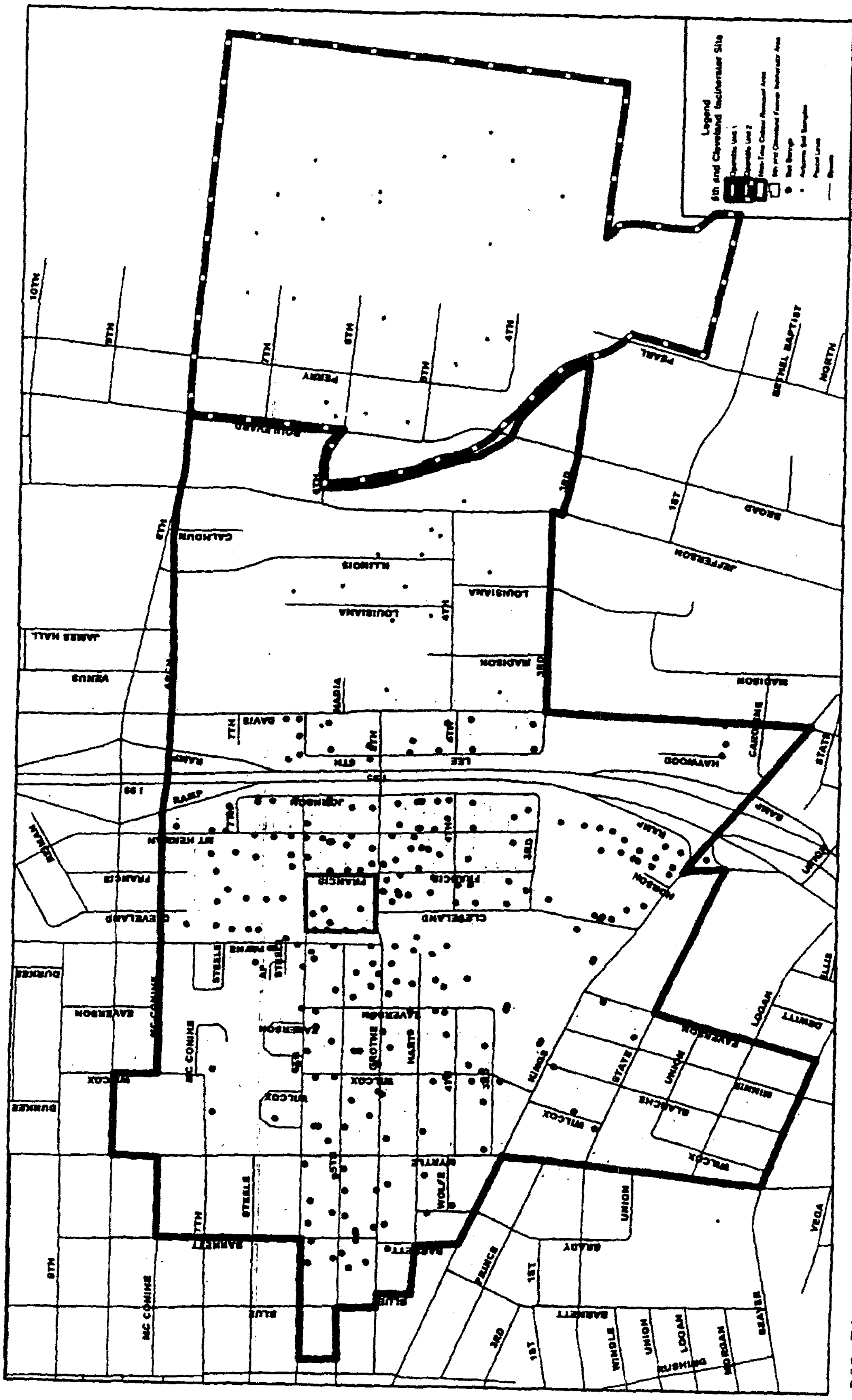
EPA acknowledges that there can be a separate cooperative cleanup agreement for the Site between the PRP and FDEP or other regulatory agencies. EPA further acknowledges that the PRP is not prevented from doing additional cleanup concurrent with the CERCLA action as long as additional cleanup does not interfere with or impede the CERCLA action. Examples of such additional cleanup may include cleanup of the Site to FDEP soil cleanup target levels that are based on acute toxicity, removal of non-hazardous solid waste, and inclusion of the Site in an area-wide program to reduce or eliminate contamination in the river basin of Hogan's Creek.

### 2.6.1 Non-Time Critical Removal

The City of Jacksonville requested a non-time critical removal (NTC Removal) that would allow the construction of a tennis facility at the Emmett Reed Park at 5th & Cleveland site (see Figure 6) using a Federal Parks and Recreation Grant for $500,000 and remove the long term threat to human health. The Engineering Evaluation/Cost Analysis (EE/CA) and Action Memorandum were completed in August 9, 2004. The AOC was signed by the City of Jacksonville on June 20, 2005. The City of Jacksonville is paying for NTC Removal.


Legend
Forest Street Incinerator Site
HOUSTON
FORSYTH
CLEVELAND
JACKSON
DORA
SPRUCE
HANOVER
MARGARET
COPELAND
CLAUDE
WATTS
OSCEOLA
WOODLAWN
BELFORT
STOCKTON
SUMMIT
ORION
IRENE
PHYLLIS
BOSSELLE
FOREST
MC COY CREEK

ROD Figure 5


Legend
5th and Cleveland Incinerator Site
PERRY
BOULEVARD
PEARL
BETHEL BAPTIST
NORTH
BROAD
JEFFERSON
CALHOUN
ILLINOIS
LOUISIANA
JAMES HALL
VENUS
MADISON
MARIA
DAVIS
LEE
HAYWOOD
CAROLINE
STATE
RAMP
JOHNSON
FRANCIS
CLEVELAND
HOBSON
DURKEE
SAVERSON
MC CONIHE
WILCOX
GROTHE
HARTS
KINGS
UNION
LOGAN
DEWITT
ELLIS
BLANCHE
MYRTLE
WOLFE
STEELE
BARRETT
PRINCE
GRADY
VEGA
ELLIS
WINDLE
RUSHING
MORGAN
BEAVER

ROD Figure 6

# PART 3: SUMMARY OF ENVIRONMENTAL CONTAMINATION

## 3.1 Site Overview

The Jacksonville Ash Superfund Site (Site) which includes three separate locations (sites) of former waste processing and/or disposal facilities operated or used by the City of Jacksonville, Florida. EPA grouped the three locations under one site designation because they have common sources and types of waste and to ensure consistency in the approach to site investigation and cleanup. Included are former city incinerators at the Forest Street site and at 5th and Cleveland site and a former dump site that is now occupied by Lonnie C. Miller, Sr. Park.

### 3.1.1 Forest Street Incinerator

The former Forest Street incinerator site occupies approximately 27 acres in an area of mixed residential and industrial land use, approximately one mile west of Jacksonville's central business district. The City of Jacksonville operated the Forest Street municipal incinerator from the 1910s until the 1960s. Although some of the ash waste was taken to other dump sites for disposal, a considerable amount was apparently deposited at and near the incinerator. The incinerator ash contains several COCs, but the main drivers for the cleanup are lead, arsenic, PAHs and dioxin.

The former incinerator area is now enclosed by a chain link fence to prevent access. The site also includes adjoining land used or potentially affected by waste handling or ash disposal activities, including the present location of the Forest Park Head Start School on the west portion of the site, a city park facility in the south portion of the site and surrounding residential properties.

### 3.1.2 5th and Cleveland Incinerator

The City of Jacksonville operated another municipal incinerator from the 1910s to the 1960s in an area just north of the intersection of 5th and Cleveland streets, approximately one mile northwest of downtown Jacksonville. The approximately 36 acre site includes the former incinerator location and other areas impacted by the ash. The incinerator ash contains several COCs, but the main drivers for the cleanup are lead, arsenic, PAHs and dioxin.

Portions of the site are now occupied by the Emmett C. Reed Community Center, pool, playground, and picnic areas, and city baseball diamond and basketball courts. Ash, containing glass and metal fragments, was disposed in several areas near the incinerator, including the present location of the park and baseball field, next to the community center, and along the east side of Francis Street. Ash is also found in some of the residential areas surrounding the former incinerator site.

### 3.1.3 Lonnie C. Miller, Sr. Park

Lonnie C. Miller, Sr. Park is located northeast of the intersection of Moncrief Road and Soutel Drive, approximately five miles northwest of downtown Jacksonville and occupies approximately 108 acres. From the 1940s to the 1960s, the owners operated a dump on a portion of the land, which was formerly used for agricultural purposes. The City of Jacksonville disposed of incinerator ash waste, and other parties reportedly disposed of septic sludge and other wastes at the dump site. The incinerator ash contains several COCs but the main drivers for the cleanup are lead, arsenic, PAHs and dioxin.

In the late 1980s, the City of Jacksonville purchased a large portion of the privately owned land to develop a regional park. The park includes a picnic shelter, playground, and walking areas. The Ribault River which borders the east side of the park, flows northeast to the Trout River.

### 3.2 Sampling Strategy

During the RI, the following media were sampled: surface soil, subsurface soil, sediment, surface water and groundwater. The RI consisted of what ultimately became three phases.

Phase I included surface water, sediment and groundwater sampling and the following soil sampling events:

- Tier 1 (Delineation) Soil Sampling
- Tier 2 (Delineation) Soil Sampling
- Characterization Soil Sampling
- Airborne Particulate Sampling

Tier 1 soil samples were analyzed by X-ray fluorescence (XRF) for lead to two feet at 6 inch intervals (four samples) to determine the extent of lead and ash contamination. Tier 2 soil samples were 5-point composited samples to two feet, one residential yard or lot further out than the last Tier 1 sample with XRF lead measurements less than 300 mg/kg.

Tier 2 soil samples were used to prove that the residential properties at the edge of the sites were not contaminated. The individual discrete Tier 2 soil samples and central composite for each of the four depth intervals were analyzed for XRF lead and visually for ash. The 0-6 inch Tier 2 soil samples was sent to the laboratory to be analyzed for full Target Analyte List (TAL) and 20 % Target Compound List (TCL) except VOCs but including dioxin and furans. Both Tier 1 and 2 locations had a single boring advanced to the water table for visual examination for ash.

Characterization soil samples were obtained in areas of known ash deposits to determine the composition of the ash and to define vertical extent. The characterization borings were advanced at one foot intervals to one foot below the ash with each interval visually checked for ash and for XRF lead. At least three soil samples from the surface (0-6 inches), within the ash and one foot below the ash were collected for laboratory analyses. Of the three (sometimes four) soil samples per characterization boring, 30% were analyzed for full TAL and 15% for TCL (except VOCs) including dioxin and furans.

Airborne particulate soil sampling was conducted at the two former incinerator sites. Based on the historical wind rose of prevalent wind directions and a simple EPA modeling of the possible areas of particulate deposition, soil samples were collected at 8 large particulate locations approximately 1,500 to 2,000 feet east of the former incinerator locations at the Forest Street and 5th & Cleveland sites. Eight small particulate soil samples were collected approximately 3,500 to 4,500 feet east of the former incinerator locations. A boring at each location was advanced to the water table at one foot intervals and visually checked for ash and XRF lead. The 0-6 inch surface samples were sent to the laboratory and analyzed for TAL metals, PAHs and 25% for dioxin and furans.

Phase II consisted of groundwater sampling and the following soil sampling event:

- Parcel-by-Parcel Soil Sampling (i.e., residential lot by lot sampling)

Around the time the June 2003 Feasibility Study was submitted, it was recognized an additional round of RI sampling at certain parcels would be worthwhile (i.e., RI Phase III). Phase III will began in late 2005 and consisted of the following:

- Parcel-by- Parcel soil sampling (i.e., residential lot by lot sampling) of those properties not previously sampled (mainly due to failure to obtain access) and re-sampling of property where information on constituent concentrations are incomplete.

Information collected during the Phase III RI will be used to further refine the areas needing remediation. Any properties identified in Phase III sampling will be addressed in a manner consistent with the selected remedy.

### 3.3 Known and/or Suspected Sources of Contamination

The source of contamination is incinerator ash from the City of Jacksonville municipal incinerators at Forest Street and 5th & Cleveland, which was deposited around the incinerator sites and at the Lonnie C. Miller, Sr. Park site. Although the ash is identified by the presence of glass and metal fragments (collectively referred to as "clinkers") and contains metals such as lead and arsenic and organics such as PAHs and dioxins.

### 3.4 Surface and Subsurface Soil Contamination

During Phase I of the RI, surface soil samples were obtained from 777 locations in 2000 through 2002. The intent of the soil sampling effort was to delineate the ash source areas and the perimeter of the source areas through visual observation, XRF screening for lead, and laboratory analysis for inorganics and organics. There were also 60 background soil locations sampled. The background samples were obtained for the three Jacksonville Ash sites and the Brown's Dump site (a separate SAS with similar ash contamination), from surface and subsurface soil not affected by site activities. Of the 777 sample locations, a subset were analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) and dioxin.

During Phase II of the RI, a total of 932 parcels of property were sampled. Each sampling event at a parcel consisted of a central boring and 4 outer borings designed to spatially represent a land parcel, lot or backyard. The one central boring was sampled to the water table and checked for visual ash and XRF lead. The four additional corner borings were sampled to 2 feet and checked for visual ash and XRF lead. Any discreet sample with XRF lead measurements in the range of 200 - 400 mg/kg were analyzed in the laboratory for lead and arsenic. A five-point soil composite sample (0-6 inches bls) was also collected from each parcel. The composite samples were examined in the field for visual ash and XRF lead. In addition, some of the surface soil composite samples were submitted to the laboratory for analysis of TAL metals (20 percent), PAHs (10 percent) and dioxins/furans (10 percent).

Surface and subsurface soils are contaminated with constituents associated with ash (e.g., lead, arsenic, PAHs, etc). Appendix C of the ROD contains tables with the occurrence and distribution of the Phase I RI soil sampling constituents of potential concern. Figures 7, 8 and 9 presents the location of ash from Phase I of the RI. Figures 10, 11 and 12 present the distribution of lead (measured by XRF) as determined during Phase I of the RI. Figures 13, 14 and 15 show the distribution of lead and other COC exceedences of RGs on a parcel-by-parcel basis from the Phase II RI. Figures 16, 17 and 18 show the areas that are set for remediation for OU1 based on information to date. The size of these areas may change somewhat based on any additional data collected during the Phase III RI sampling or during the remedial design or remedial action. The estimated volume of surface and subsurface soil contaminated at concentrations above RGs at all three sites is approximately 1,323,000 cubic yards.

The samples for air-borne surface soil deposition were obtained in areas located approximately 1,500 to 2,000 feet (large particulate) and 3,500 to 4,500 feet (small particulate) east of the former incinerator sites at Forest Street and 5th & Cleveland. The sampling results at the Forest Street large particulate locations show 2 of the 9 soil samples have lead above 400 ppm, arsenic above 2.1 ppm and PAHs above the background levels. Dioxin was above the dioxin background of 8.8 ppm in 2 of the 2 samples analyzed for dioxin. The sampling results at the 5th & Cleveland large particulate locations show none of the 8 soil samples have lead above 400 ppm or arsenic above 2.1 ppm. PAHs above the background levels were found in 1 of the 8 samples. Dioxin was above the dioxin background of 8.8 ppm in 2 of the 3 samples analyzed for dioxin. These results did not indicate wide spread air-borne deposition above remedial goals, however the soil sampling for OU1 has expanded to encompass the large particulate sampling areas. Remediation of these areas will take place along with the rest of OU1.

The sampling results at the Forest Street small particulate locations show 4 of the 9 soil samples have lead above 400 ppm, 5 of the 9 soil samples have arsenic above 2.1 ppm and 3 of the 9 soil samples have PAHs above the background levels. Dioxin was above the dioxin background of 8.8 ppm in 2 of the 2 samples analyzed for dioxin. The sampling results at the 5th & Cleveland small particulate locations show 1 of the 8 soil samples have lead above 400 ppm. None of the small particulate soil samples have arsenic above 2.1 ppm or PAHs above the background levels. Dioxin was not found above the dioxin background of 8.8 ppm in the 1 sample analyzed for dioxin. These results did not indicate wide spread air-borne deposition above remedial goals, however small deposits of ash were identified in some areas. These small deposits are thought to be dumping areas and not from air deposition. The small particulate sampling areas are proposed for additional sampling during the OU2 sampling and will be remediated as part of OU2.

## 3.5 Sediment Contamination

### 3.5.1 Forest Street Incinerator

During RI sampling events in 2000, a total of 8 sediment samples and 7 sediment background samples were obtained from McCoy's Creek. All 15 samples were analyzed for TAL metals, SVOCs, pesticides and polychlorinated biphenyls (PCBs). Three samples were also analyzed for dioxins and VOCs.

Table 1 lists the constituents detected by sediment analysis.

### 3.5.2 5th and Cleveland Incinerator

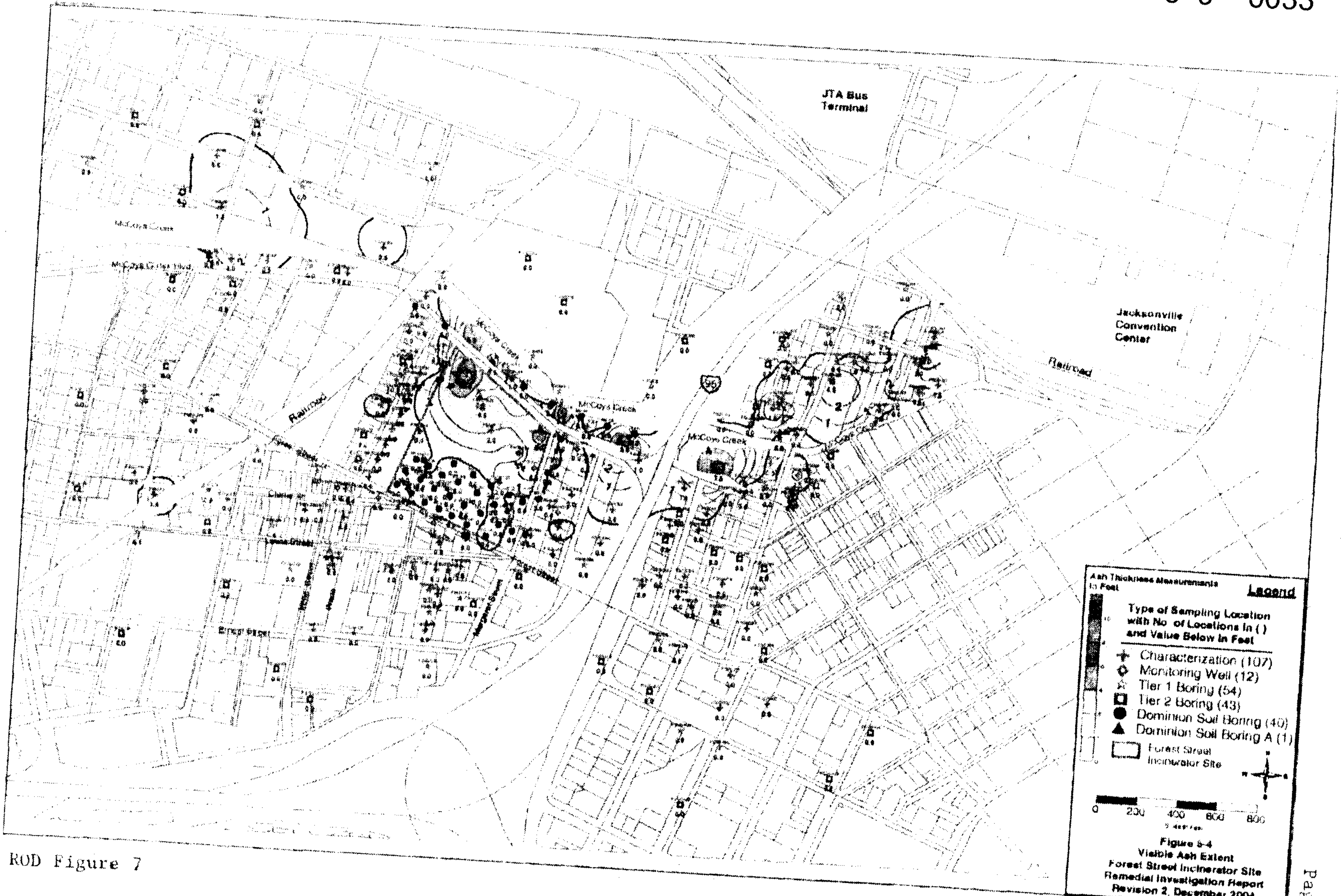
During RI sampling events in 2000, a total of 14 sediment samples were obtained from the drainage ditch, underground culvert and Hogan's Creek. All 14 samples were analyzed for TAL metals, SVOCs, pesticides and polychlorinated biphenyls (PCBs). Two samples were also analyzed for dioxins and VOCs.

Table 2 lists the constituents detected by sediment analysis.

### 3.5.3 Lonnie C. Miller, Sr. Park

During RI sampling events in 2000, a total of 26 sediment samples and 8 sediment background samples were obtained from the drainage ditch in the park and the Ribault River. All 34 samples were analyzed for TAL metals, SVOCs, pesticides and polychlorinated biphenyls (PCBs). Eight samples were analyzed for VOCs. Five samples were analyzed for dioxin by screening method (Method 4425) and one sample by lab method (Method 8290).

Table 3 lists the constituents detected by sediment analysis.


JTA Bus Terminal
Jacksonville Convention Center
Railroad
McCoys Creek
Railroad
Forest Street
Ash Thickness Measurements in Feet
Legend
Type of Sampling Location with No. of Locations in ( ) and Value Below in Feet
Characterization (107)
Monitoring Well (12)
Tier 1 Boring (54)
Tier 2 Boring (43)
Dominion Soil Boring (40)
Dominion Soil Boring A (1)
Forest Street Incinerator Site
0 230 400 600 800
Figure 5-4
Visible Ash Extent
Forest Street Incinerator Site
Remedial Investigation Report
Revision 2, December 2004

ROD Figure 7

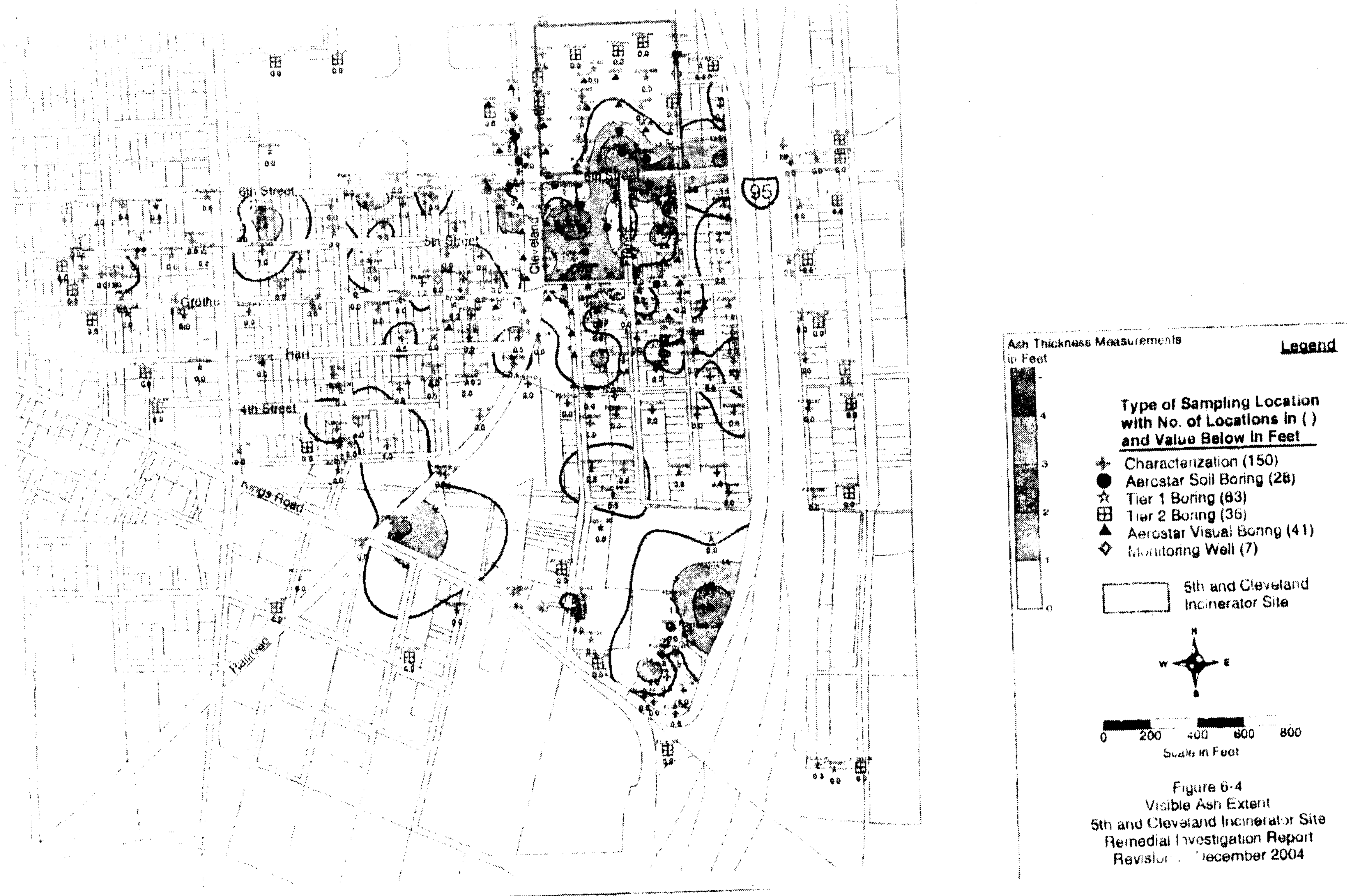



Figure 6-4
Visible Ash Extent
5th and Cleveland Incinerator Site
Remedial Investigation Report
Revision . December 2004

ROD Figure 8

5 9 0035

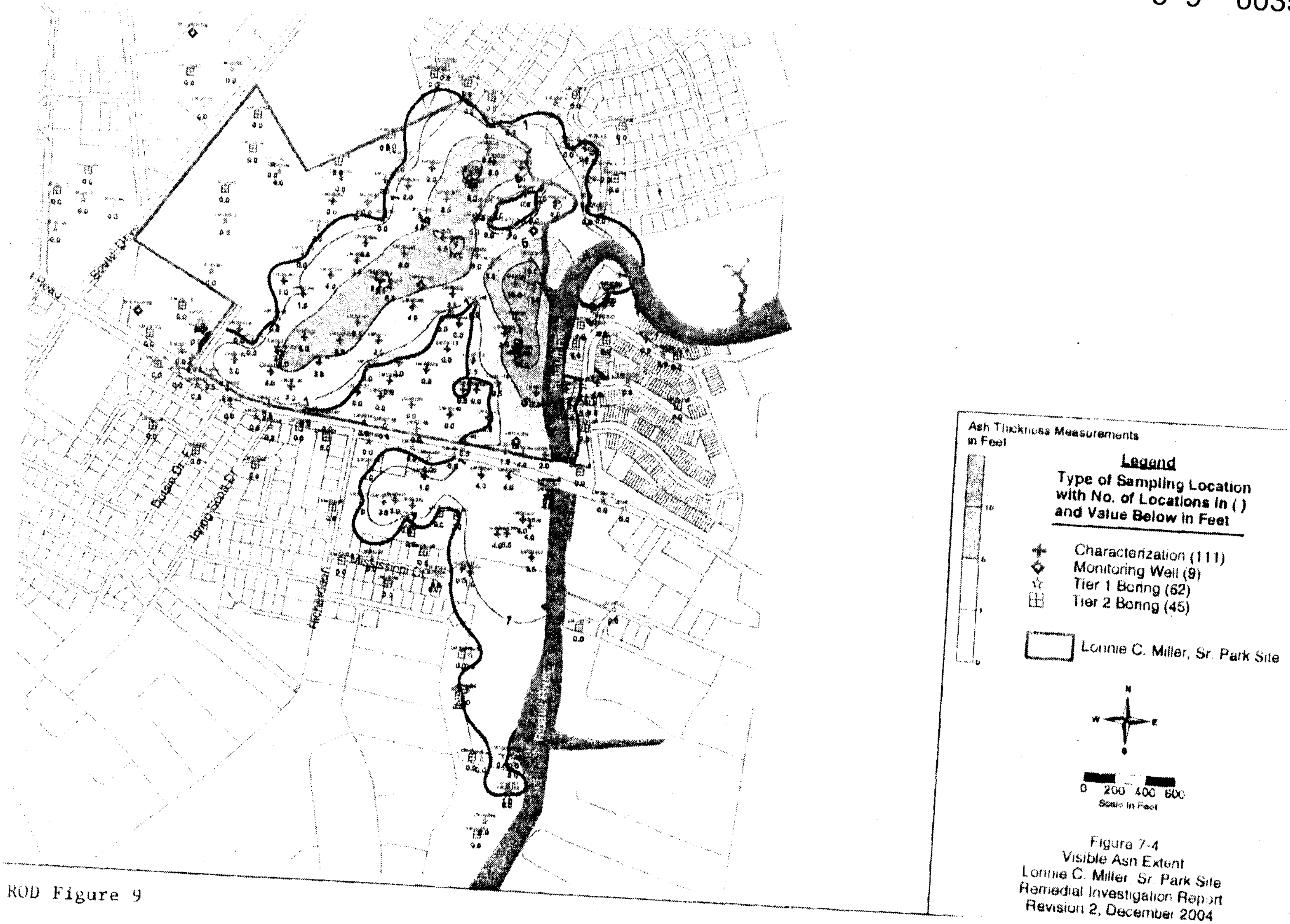
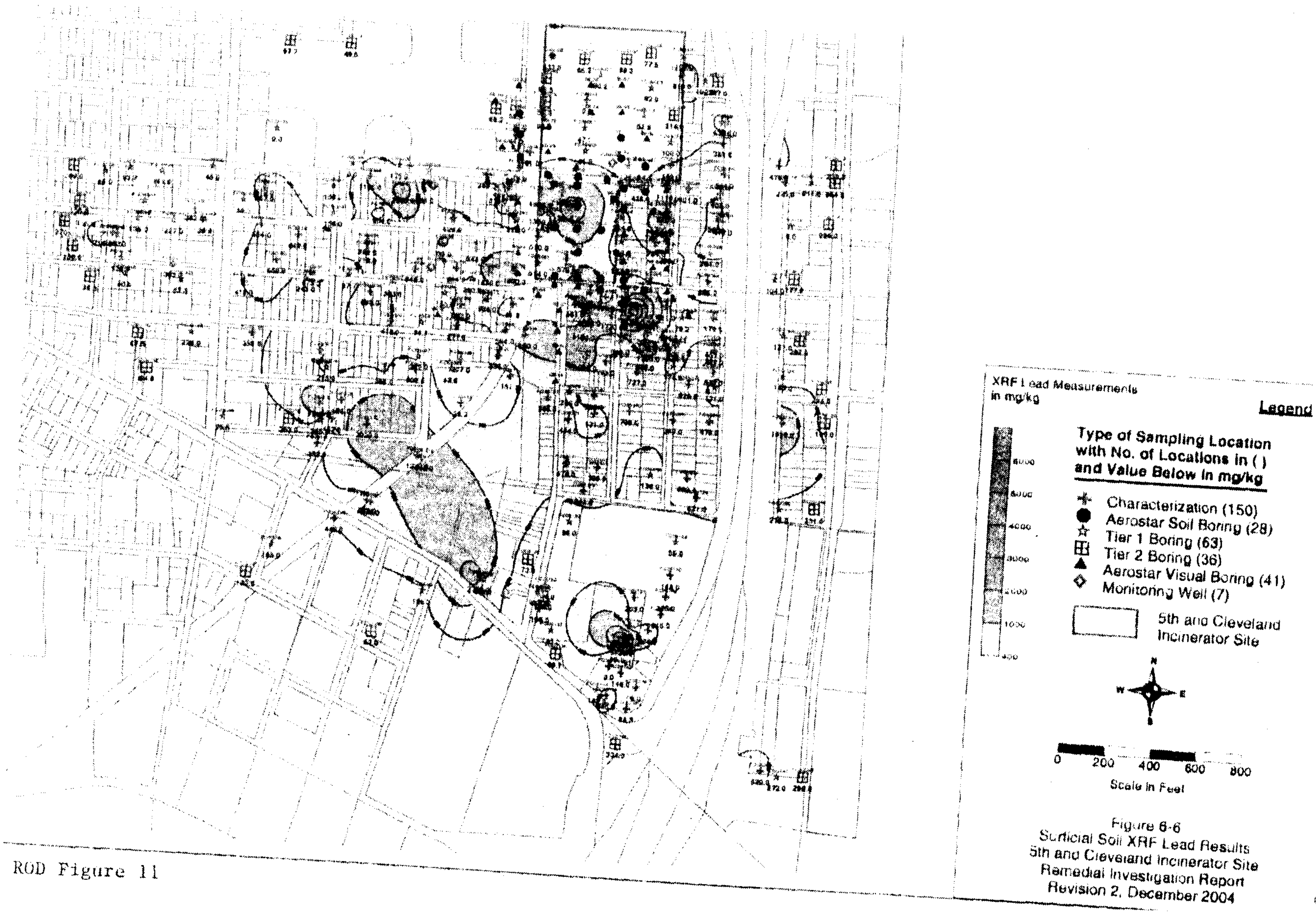



Figure 7-4
Visible Ash Extent
Lonnie C. Miller Sr. Park Site
Remedial Investigation Report
Revision 2, December 2004

ROD Figure 9


ROD Figure 10

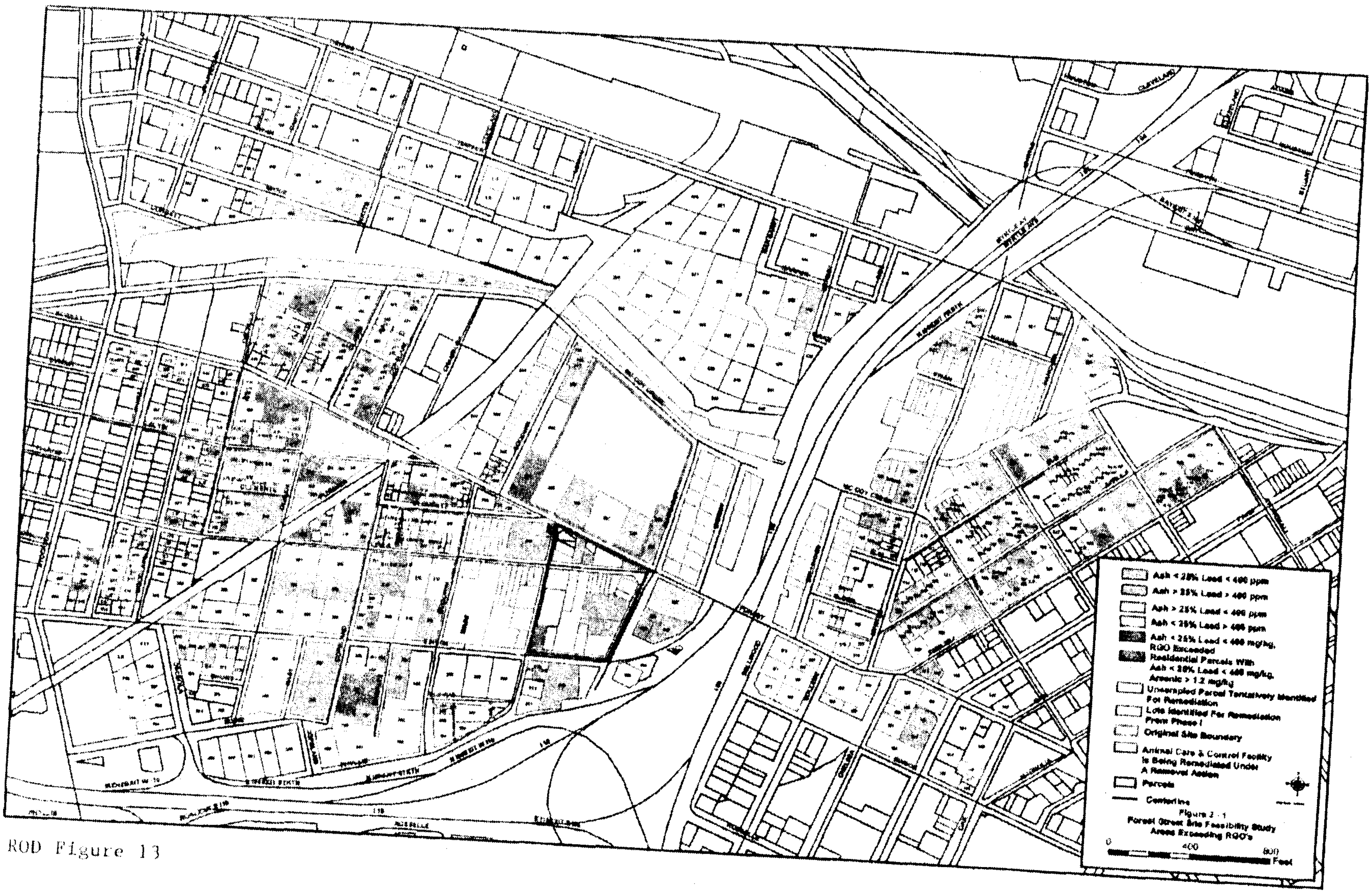



ROD Figure 11


Figure 7-6
Surficial Soil XRF Lead Results
Lonnie C. Miller Sr. Park Site
Remedial Investigation Report
Revision 2, December 2004

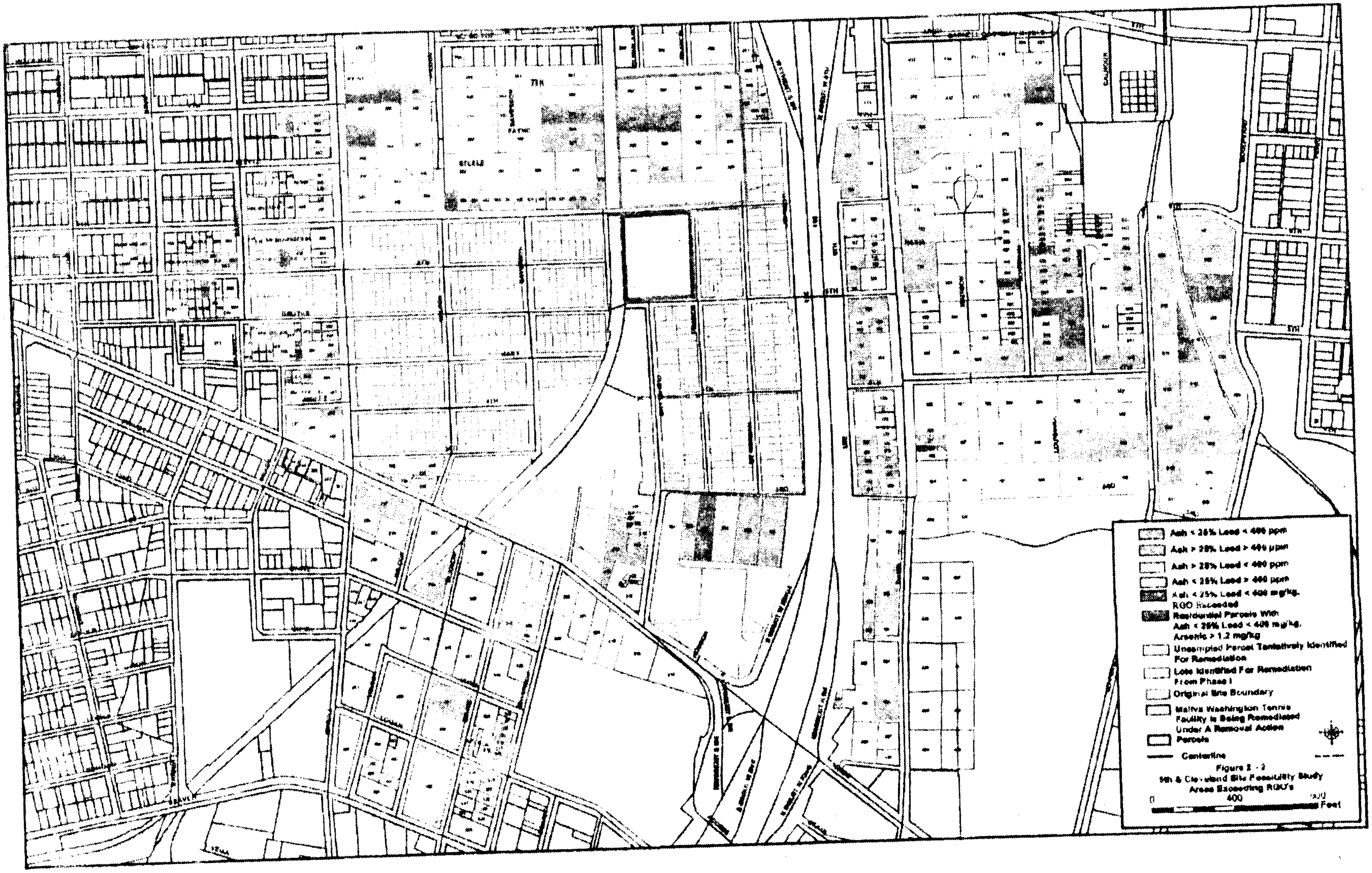
ROD Figure 12

5 9 0039




ROD Figure 13

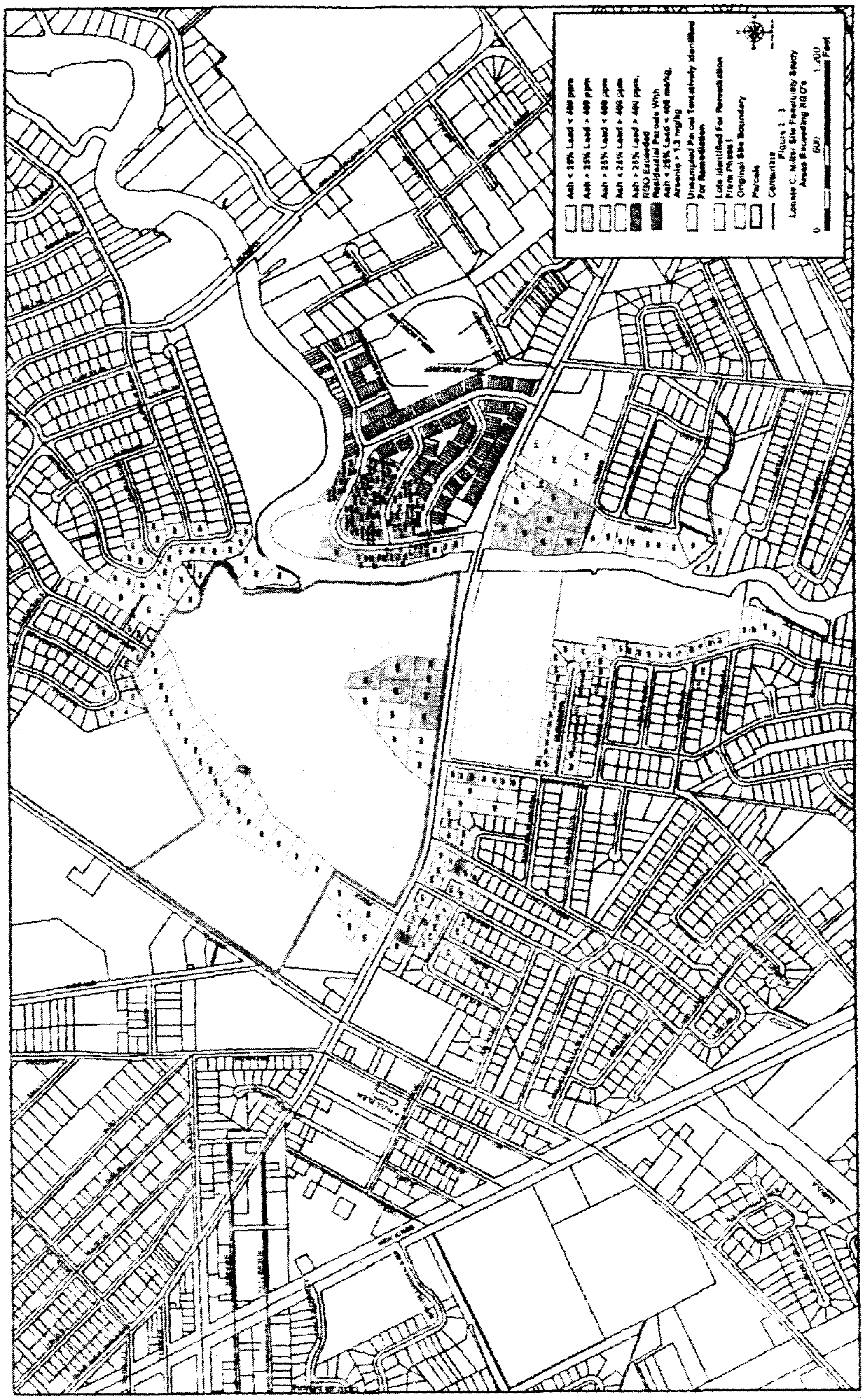
5 9 0040




ROD Figure 14

5 9 0041

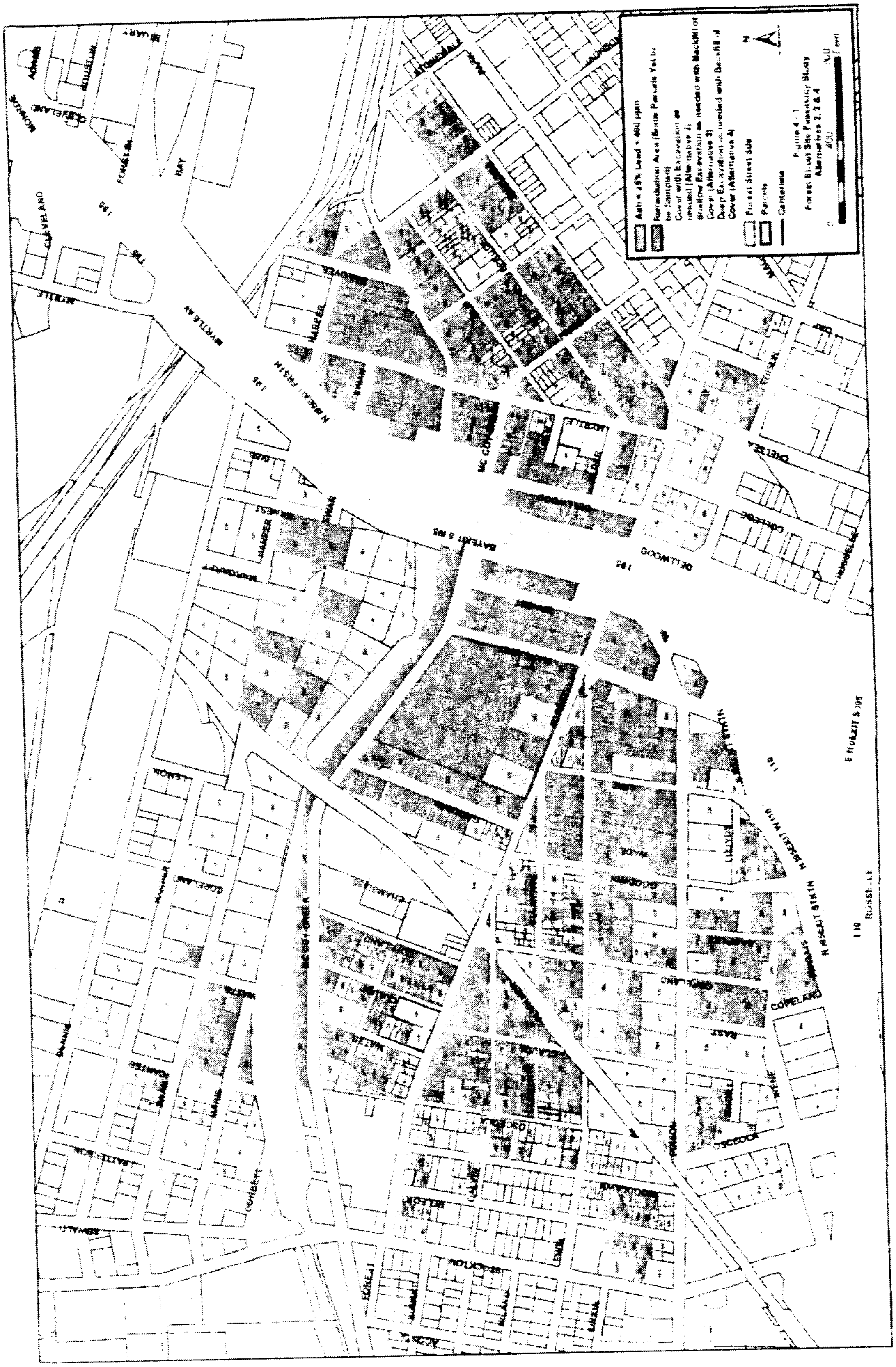





ROD Figure 15

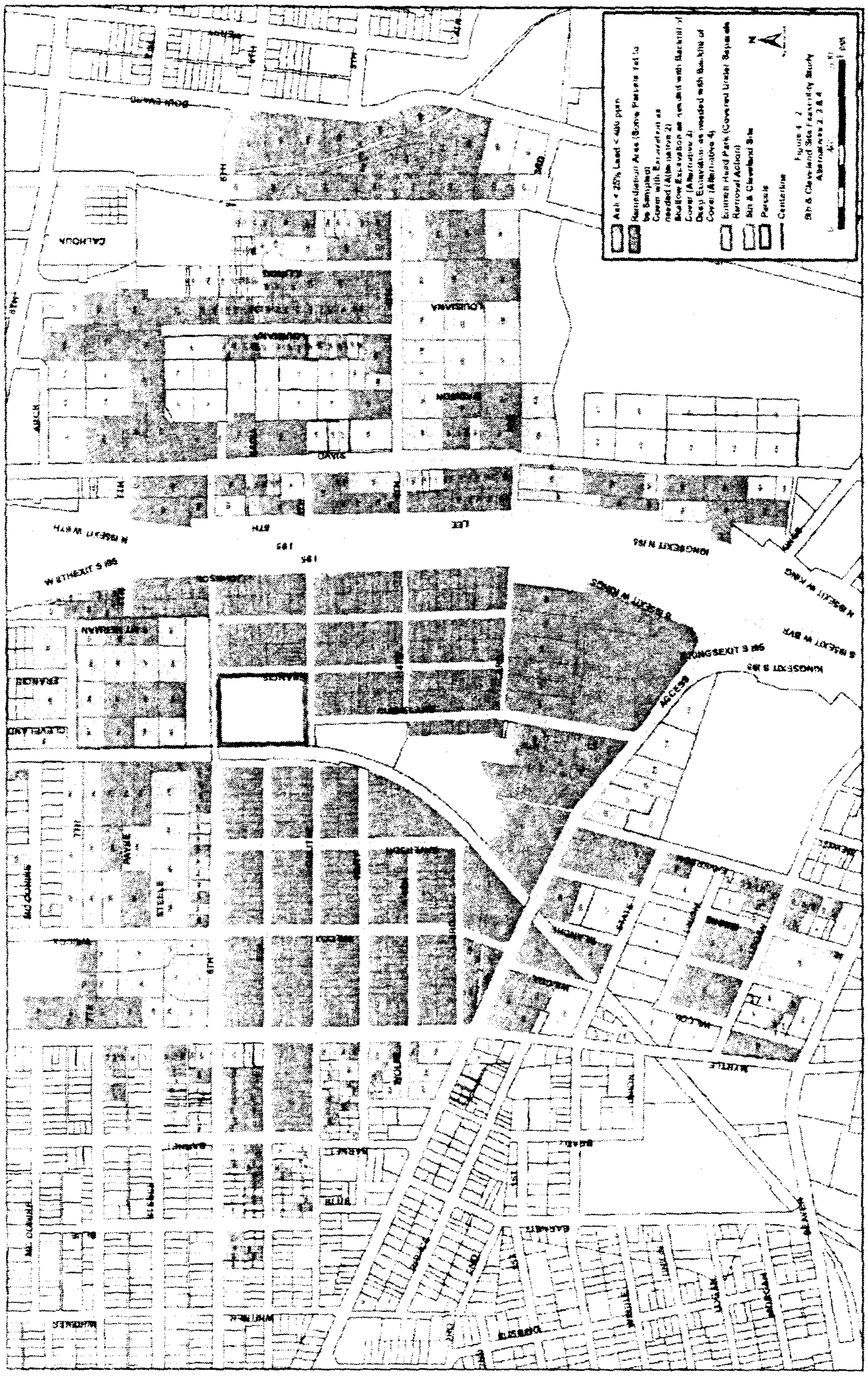
5 9 0042





ROD Figure 16

59 0043



ROD Figure 17

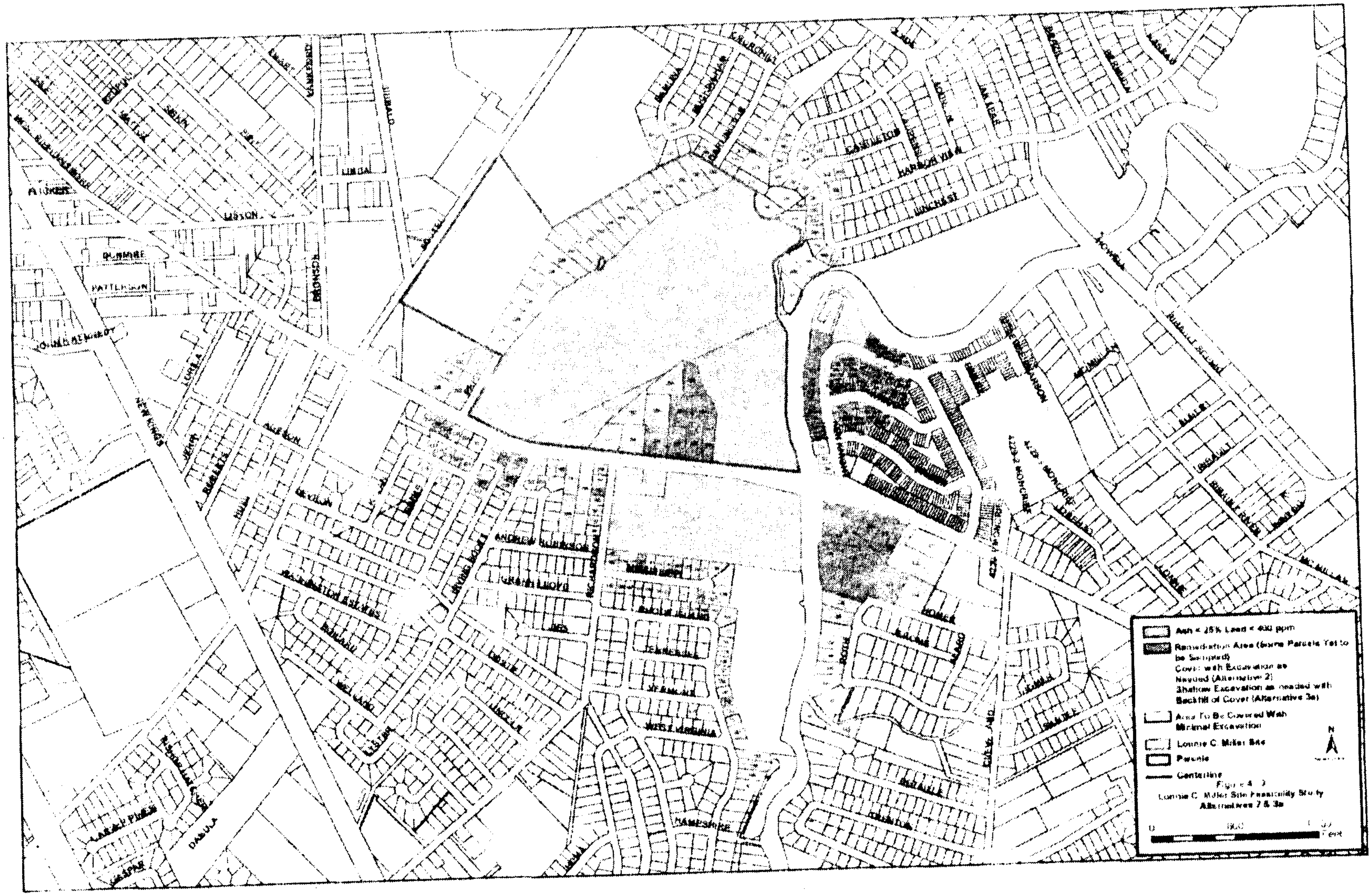

Ash < 25% Lead < 400 ppm
Cover with Excavation as Needed (Alternative 2)
Shallow Excavation as needed with Backfill of Cover (Alternative 3a)
Area To Be Covered With Minimal Excavation
Lonnie C. Miller Site
Parcels
Centerline
N
Lonnie C. Miller Site Feasibility Study
Alternatives 2 & 3a
Feet

Figure 18

**Table 2-5**
**Sediment Sample Results and Selection of PCOPEC and COPEC**
**Forrest Street Site**
**Jacksonville Ash Superfund Site**
**Page 1 of 1**

| Parameter Name | Samples from Areas of Expected Contamination | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | FSSW001 | | FSSW002 | | FSSW003 | | FSSW004 | | FSSW005 | | FSSW006 | | FSSW007 | | FSSW008 | |
| | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q | Result | Q |
| **Dioxins (ng/KG)** | | | | | | | | | | | | | | | | |
| ADJUSTED TEQ OF 2,3,7,8-TCDD | 21.33 | = | | | | | | | 13.14 | = | | | 12.626 | = | | |
| **Inorganics (mg/KG)** | | | | | | | | | | | | | | | | |
| ALUMINUM | 1100 | = | 2100 | = | 1700 | = | 4800 | J | 5200 | J | 1700 | J | 1200 | J | 590 | J |
| ANTIMONY | | UJ | | UJ | | UJ | | U | | U | | U | 14 | J | | U |
| ARSENIC | 1.8 | J | 3.9 | = | 2.2 | J | 4.9 | = | 2.5 | J | 2.7 | = | 1.7 | J | 0.92 | J |
| BARIUM | 35 | J | 60 | J | 27 | J | 51 | J | 130 | J | 35 | J | 28 | J | 10 | J |
| BERYLLIUM | 0.14 | J | 0.2 | J | 0.14 | J | 0.34 | J | 1.2 | J | 0.19 | J | 0.089 | J | | U |
| CADMIUM | 0.43 | J | 0.31 | J | 0.4 | J | 1 | J | 0.63 | J | 0.5 | J | 0.38 | J | 0.17 | J |
| CALCIUM | 45000 | J | 65000 | J | 29000 | J | 42000 | = | 94000 | = | 54000 | = | 34000 | = | 12000 | = |
| CHROMIUM, TOTAL | 11 | = | 20 | = | 9.3 | = | 15 | = | 12 | = | 79 | = | 8.1 | = | 3.9 | = |
| COBALT | 1.1 | J | 2 | J | 0.83 | J | 1.9 | J | 1.3 | J | 1 | J | 0.71 | J | 0.49 | J |
| COPPER | 18 | = | 28 | = | 13 | = | 56 | = | 17 | = | 31 | = | 12 | = | 12 | = |
| IRON | 3800 | = | 7800 | = | 3500 | = | 11000 | = | 4300 | = | 4700 | = | 3700 | = | 1800 | = |
| LEAD | 84 | J | 248 | J | 49 | J | 118 | J | 178 | J | 120 | = | 460 | J | 190 | J |
| MAGNESIUM | 1300 | = | 2300 | = | 1000 | J | 5800 | = | 4000 | = | 1400 | = | 1200 | J | 620 | J |
| MANGANESE | 74 | = | 130 | = | 80 | = | 100 | J | 180 | J | 80 | J | 56 | J | 20 | J |
| NICKEL | 3.1 | J | 5.3 | J | 2.8 | J | 5.4 | J | 6.6 | J | 3.3 | J | 2.8 | J | 1 | J |
| POTASSIUM | 150 | J | 240 | J | 270 | J | 780 | J | 780 | J | 350 | J | 220 | J | 140 | J |
| SILVER | 0.75 | J | | U | | U | | UJ | 2.7 | = | | UJ | | UJ | | UJ |
| SODIUM | 800 | J | 1800 | J | 1800 | = | 4900 | = | 1800 | = | 2400 | J | 1400 | J | 1900 | J |
| VANADIUM | 5 | J | 8.7 | J | 4.3 | J | 12 | J | 5.6 | J | 7.3 | J | 3.8 | J | 1.9 | J |
| ZINC | 480 | J | 778 | J | 380 | J | 480 | = | 480 | = | 440 | = | 480 | = | 300 | = |
| MERCURY | | UJ | 0.087 | J | | UJ | 0.22 | = | | U | | U | | U | | U |
| **Pesticides (ug/KG)** | | | | | | | | | | | | | | | | |
| ALPHA-CHLORDANE | 11 | J | 6.1 | J | 3 | J | 6.2 | J | 6 | = | 5.3 | J | 2.8 | J | 2.2 | J |
| DIELDRIN | 9.1 | J | | U | 1.8 | J | | U | 2.2 | J | | U | | U | | U |
| ENDRIN | | U | | U | 0.7 | J | | U | | U | | U | | U | | U |
| ENDRIN ALDEHYDE | | UJ | | U | 4.6 | J | | U | | U | | U | | U | | U |
| GAMMA-CHLORDANE | 34 | = | 32 | J | 12 | J | 17 | J | 18 | = | 14 | = | 3.8 | = | 5 | = |
| p,p-DDD | 5.7 | = | | U | 1.2 | J | | U | | U | | U | 4.2 | = | | U |
| p,p-DDE | 4.8 | J | 2 | J | 1.2 | J | 3.9 | J | 3.7 | J | 2.8 | J | 1.3 | J | 1.8 | J |
| **PCBs (ug/KG)** | | | | | | | | | | | | | | | | |
| PCB-1248 (AROCHLOR 1248) | 170 | = | | U | | U | | U | | U | | U | | U | | U |
| PCB-1254 (AROCHLOR 1254) | 180 | = | | U | | U | | U | | U | | U | | U | | U |
| PCB-1260 (AROCHLOR 1260) | 110 | = | | U | | U | 87 | J | 88 | = | 76 | = | 33 | J | 48 | = |
| **Volatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | | | |
| 1,4-DICHLOROBENZENE | 9 | J | | | | | | | | U | | | | U | | |
| ACETONE | 160 | = | | | | | | | | UJ | | | | UJ | | |
| CARBON DISULFIDE | 4.1 | J | | | | | | | 5.5 | J | | | 20 | = | | |
| METHYL ETHYL KETONE (2-BUTANONE) | 26 | = | | | | | | | 22 | = | | | 14 | = | | |
| TOLUENE | 3.2 | J | | | | | | | | U | | | | U | | |
| **Semivolatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | | | |
| ACENAPHTHYLENE | | U | | U | | U | 52 | J | | U | | U | | U | | U |
| ANTHRACENE | 46 | J | | U | | U | | U | 120 | J | | U | | U | | U |
| BENZO(a)ANTHRACENE | 240 | J | 140 | J | 200 | J | 340 | J | 610 | = | 120 | J | 100 | J | 100 | J |
| BENZO(a)PYRENE | 290 | J | | U | 270 | J | 640 | J | 640 | = | 180 | J | 160 | J | 130 | J |
| BENZO(b)FLUORANTHENE | 270 | J | | U | 310 | J | 580 | J | 570 | = | 210 | J | 150 | J | 160 | J |
| BENZO(g,h,i)PERYLENE | 290 | J | | U | 230 | J | 440 | J | 500 | J | 180 | J | 150 | J | 130 | J |
| BENZO(k)FLUORANTHENE | 300 | J | | U | 240 | J | 330 | J | 510 | = | 170 | J | 130 | J | 89 | J |
| BENZYL BUTYL PHTHALATE | 67 | J | | U | 200 | J | | U | | U | | U | | U | 83 | J |
| bis(2-ETHYLHEXYL) PHTHALATE | | U | | U | 250 | J | | U | | U | | U | | U | | U |
| CARBAZOLE | 42 | J | | U | | U | | U | 32 | J | | U | | U | | U |
| CHRYSENE | 300 | J | 240 | J | 290 | J | 660 | J | 670 | = | 170 | J | 160 | J | 140 | J |
| DIBENZ(a,h)ANTHRACENE | 77 | J | | U | | U | 210 | J | 120 | J | | U | | U | | U |
| Di-n-OCTYLPHTHALATE | 110 | J | | U | 100 | J | | U | | U | 81 | J | | U | | U |
| FLUORANTHENE | 600 | = | 340 | J | 370 | J | 480 | J | 1300 | = | 280 | J | 230 | J | 240 | J |
| INDENO(1,2,3-c,d)PYRENE | 270 | J | | U | 220 | J | 300 | J | 310 | J | 100 | J | 110 | J | 96 | J |
| PHENANTHRENE | 220 | J | 88 | J | 88 | J | 120 | J | 330 | J | 81 | J | 61 | J | 57 | J |
| PYRENE | 480 | = | 370 | J | 380 | J | 770 | = | 1000 | = | 240 | J | 230 | J | 390 | J |
| **Physical Characteristics (mg/KG)** | | | | | | | | | | | | | | | | |
| TOTAL ORGANIC CARBON | 13000 | = | 20000 | = | 11000 | = | 40000 | = | 17000 | = | 8200 | = | 5500 | = | 4000 | = |

| Parameter Name | Total Samples | Total Detections | AOC Samples | | | Screening for PCOPC Selection | | | | Refinement for Direct Exposure COPC Selection | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Minimum Detected | Average Detected | Maximum Detected | Approved Screening Value | Total Detections > Screening Value | AOC Screening HQ Based on Maximum | Selected as PCOPC? | Approved Refinement Value | Total Detections > Refinement Value | AOC Refinement HQ Based on Maximum | Selected as COPC? | Rationale for selection as COPEC |
| **Dioxins (ng/KG)** | | | | | | | | | | | | | | |
| ADJUSTED TEQ OF 2,3,7,8-TCDD | 3 | 3 | 12.63 | 15.70 | 21.33 | 2.5 | 3 | 8.53 | Yes | 25 | 0 | 0.85 | No | HQ was below 1 |
| **Inorganics (mg/KG)** | | | | | | | | | | | | | | |
| ALUMINUM | 8 | 8 | 590.00 | 2298.75 | 5200.00 | - | - | - | Yes | - | - | - | Yes | No refinement value |
| ANTIMONY | 8 | 1 | 14.00 | 14.00 | 14.00 | 2 | 1 | 7.00 | Yes | 25 | 0 | 0.56 | No | HQ was below 1 |
| ARSENIC | 8 | 8 | 0.92 | 2.58 | 4.90 | 7.24 | 0 | 0.68 | No | | | | | |
| BARIUM | 8 | 8 | 10.00 | 48.75 | 130.00 | - | - | - | Yes | 200 | 0 | 0.65 | No | HQ was below 1 |
| BERYLLIUM | 8 | 7 | 0.09 | 0.33 | 1.20 | - | - | - | Yes | - | - | - | Yes | No refinement value |
| CADMIUM | 8 | 8 | 0.17 | 0.55 | 1.00 | 0.676 | 2 | 1.48 | Yes | 3.5 | 0 | 0.29 | No | HQ was below 1 |
| CALCIUM | 8 | 8 | 12000.00 | 46875.00 | 94000.00 | - | - | - | Yes | - | - | - | No | Essential nutrient |
| CHROMIUM, TOTAL | 8 | 8 | 3.90 | 13.98 | 79.00 | 52.3 | 0 | 0.55 | No | | | | | |
| COBALT | 8 | 8 | 0.49 | 1.17 | 2.00 | 50 | 0 | 0.04 | No | | | | | |
| COPPER | 8 | 8 | 12.00 | 21.88 | 56.00 | 18.7 | 3 | 2.99 | Yes | 108 | 0 | 0.52 | No | HQ was below 1 |
| IRON | 8 | 8 | 1800.00 | 5050.00 | 11000.00 | - | - | - | Yes | 20000 | 0 | 0.55 | No | HQ was below 1 |
| LEAD | 8 | 8 | 49.00 | 199.13 | 460.00 | 30.2 | 7 | 15.23 | Yes | 81.3 | 8 | 5.66 | Yes | HQ greater than 1 |
| MAGNESIUM | 8 | 8 | 620.00 | 2177.50 | 5800.00 | - | - | - | Yes | - | - | - | No | Essential nutrient |
| MANGANESE | 8 | 8 | 20.00 | 85.00 | 180.00 | - | - | - | Yes | 460 | 0 | 0.39 | No | HQ was below 1 |
| NICKEL | 8 | 8 | 1.00 | 3.78 | 6.60 | 15.9 | 0 | 0.42 | No | | | | | |
| POTASSIUM | 8 | 8 | 140.00 | 363.75 | 780.00 | - | - | - | Yes | - | - | - | No | Essential nutrient |
| SILVER | 8 | 2 | 0.75 | 1.48 | 2.70 | 0.733 | 1 | 3.68 | Yes | 1.77 | 1 | 1.53 | No | Low magnitude of exceedance |
| SODIUM | 8 | 8 | 800.00 | 2092.50 | 4900.00 | - | - | - | Yes | - | - | - | No | Essential nutrient |
| VANADIUM | 8 | 8 | 1.90 | 8.20 | 12.00 | - | - | - | Yes | - | - | - | Yes | No refinement value |
| ZINC | 8 | 8 | 300.00 | 467.50 | 720.00 | 124 | 7 | 5.81 | Yes | 270 | 8 | 2.66 | Yes | HQ greater than 1 |
| MERCURY | 8 | 2 | 0.09 | 0.15 | 0.22 | 0.13 | 1 | 1.69 | Yes | 0.488 | 0 | 0.45 | No | HQ was below 1 |
| **Pesticides (ug/KG)** | | | | | | | | | | | | | | |
| ALPHA-CHLORDANE | 8 | 8 | 2.20 | 5.23 | 11.00 | 0.5 | 7 | 22.00 | Yes | 4.79 | 4 | 2.30 | Yes | HQ greater than 1 |
| DIELDRIN | 8 | 3 | 1.60 | 4.30 | 9.10 | 0.02 | 3 | 455.00 | Yes | 4.3 | 1 | 2.12 | Yes | HQ greater than 1 |
| ENDRIN | 8 | 1 | 0.70 | 0.70 | 0.70 | 0.02 | 1 | 35.00 | Yes | 62.4 | 0 | 0.01 | No | HQ was below 1 |
| ENDRIN ALDEHYDE | 8 | 1 | 4.60 | 4.60 | 4.60 | 3700 | 0 | 0.001 | No | | | | | |
| GAMMA-CHLORDANE | 8 | 8 | 3.50 | 16.69 | 34.00 | 0.5 | 7 | 68.00 | Yes | 4.79 | 7 | 7.10 | Yes | HQ greater than 1 |
| p,p-DDD | 8 | 3 | 1.20 | 4.03 | 5.70 | 1.22 | 2 | 4.67 | Yes | 7.81 | 0 | 0.73 | No | HQ was below 1 |
| p,p-DDE | 8 | 8 | 1.20 | 2.80 | 4.80 | 2.07 | 4 | 2.32 | Yes | 6.75 | 0 | 0.73 | No | HQ was below 1 |
| **PCBs (ug/KG)** | | | | | | | | | | | | | | |
| PCB-1248 (AROCHLOR 1248) | 8 | 1 | 170.00 | 170.00 | 170.00 | 34.1 | 1 | 4.99 | Yes | 189 | 0 | 0.90 | No | HQ was below 1 |
| PCB-1254 (AROCHLOR 1254) | 8 | 1 | 180.00 | 180.00 | 180.00 | 34.1 | 1 | 5.28 | Yes | 180 | 1 | 1.01 | No | Low magnitude of exceedance |
| PCB-1260 (AROCHLOR 1260) | 8 | 6 | 33.00 | 83.00 | 110.00 | 34.1 | 4 | 3.23 | Yes | 189 | 0 | 0.58 | No | HQ was below 1 |
| **Volatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | |
| 1,4-DICHLOROBENZENE | 3 | 1 | 9.00 | 9.00 | 9.00 | 1450 | 0 | 0.01 | No | | | | | |
| ACETONE | 3 | 1 | 160.00 | 160.00 | 160.00 | 453.37 | 0 | 0.35 | No | | | | | |
| CARBON DISULFIDE | 3 | 3 | 4.10 | 9.87 | 20.00 | 133.97 | 0 | 0.15 | No | | | | | |
| METHYL ETHYL KETONE (2-BUTANONE) | 3 | 3 | 14.00 | 20.67 | 26.00 | 138.98 | 0 | 0.19 | No | | | | | |
| TOLUENE | 3 | 1 | 3.20 | 3.20 | 3.20 | 52900 | 0 | 0.0001 | No | | | | | |
| **Semivolatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | |
| ACENAPHTHYLENE | 8 | 1 | 52.00 | 52.00 | 52.00 | 5.87 | 1 | 8.86 | Yes | 128 | 0 | 0.41 | No | HQ was below 1 |
| ANTHRACENE | 8 | 2 | 46.00 | 83.00 | 120.00 | 46.9 | 1 | 2.56 | Yes | 245 | 0 | 0.49 | No | HQ was below 1 |
| BENZO(a)ANTHRACENE | 8 | 8 | 100.00 | 231.25 | 610.00 | 74.8 | 7 | 8.16 | Yes | 385 | 1 | 1.58 | No | Low magnitude of exceedance |
| BENZO(a)PYRENE | 8 | 7 | 130.00 | 314.29 | 640.00 | 88.8 | 6 | 7.21 | Yes | 763 | 0 | 0.84 | No | HQ was below 1 |
| BENZO(b)FLUORANTHENE | 8 | 7 | 150.00 | 331.43 | 580.00 | 10400 | 0 | 0.06 | No | | | | | |
| BENZO(g,h,i)PERYLENE | 8 | 7 | 130.00 | 272.86 | 500.00 | 170 | 5 | 2.94 | Yes | - | - | - | Yes | No refinement value |
| BENZO(k)FLUORANTHENE | 8 | 7 | 89.00 | 245.57 | 510.00 | 240 | 3 | 2.13 | Yes | - | - | - | Yes | No refinement value |
| BENZYL BUTYL PHTHALATE | 8 | 3 | 83.00 | 116.67 | 200.00 | 4190 | 0 | 0.05 | No | | | | | |
| bis(2-ETHYLHEXYL) PHTHALATE | 8 | 1 | 250.00 | 250.00 | 250.00 | 182 | 1 | 1.37 | Yes | 2647 | 0 | 0.13 | No | HQ was below 1 |
| CARBAZOLE | 8 | 2 | 32.00 | 37.00 | 42.00 | - | - | - | Yes | - | - | - | Yes | No refinement value |
| CHRYSENE | 8 | 8 | 140.00 | 305.00 | 670.00 | 108 | 7 | 6.20 | Yes | 846 | 0 | 0.79 | No | HQ was below 1 |
| DIBENZ(a,h)ANTHRACENE | 8 | 3 | 77.00 | 135.67 | 210.00 | 6.22 | 3 | 33.76 | Yes | 135 | 1 | 1.56 | No | Low magnitude of exceedance |
| Di-n-OCTYLPHTHALATE | 8 | 3 | 81.00 | 97.00 | 110.00 | 40600 | 0 | 0.0027 | No | | | | | |
| FLUORANTHENE | 8 | 8 | 230.00 | 467.50 | 1300.00 | 113 | 7 | 11.50 | Yes | 1494 | 0 | 0.87 | No | HQ was below 1 |
| INDENO(1,2,3-c,d)PYRENE | 8 | 7 | 96.00 | 200.88 | 310.00 | 200 | 4 | 1.55 | Yes | - | - | - | Yes | No refinement value |
| PHENANTHRENE | 8 | 8 | 57.00 | 129.63 | 330.00 | 86.7 | 5 | 3.81 | Yes | 515 | 0 | 0.64 | No | HQ was below 1 |
| PYRENE | 8 | 8 | 200.00 | 458.75 | 1000.00 | 153 | 7 | 6.54 | Yes | 875 | 1 | 1.14 | No | Low magnitude of exceedance |
| **Physical Characteristics (mg/KG)** | | | | | | | | | | | | | | |
| TOTAL ORGANIC CARBON | 8 | 8 | 4000.00 | 14587.50 | 40000.00 | - | - | - | No | | | | | |

ROD Table 1

Notes:
= Unqualified
U Undetected
J Estimated value
R Data was rejected
Samples shown in yellow exceed screening value
Samples shown in orange exceed refinement value
Screened COPECs are blacked out

Table 2-5
Sediment Sample Results and Selection of PCOPEC and COPEC
Jacksonville Ash Superfund Site
5th and Cleveland
Page 1 of 1

Samples from Areas of Expected Contamination

| Parameter Name | FCSW001 Result Q | FCSW004 Result Q | FCSW005 Result Q | FCSW008 Result Q | FCSW011 Result Q | FCSW012 Result Q | FCSW013 Result Q |
|---|---|---|---|---|---|---|---|
| Dioxins (ng/KG) | | | | | | | |
| ADJUSTED TEQ OF 2,3,7,8-TCDD | | | 34.112 J | | | 804.34 J | |
| Inorganics (mg/KG) | | | | | | | |
| ALUMINUM | 1500 * | 500 * | 400 * | 280 * | 430 * | 9100 * | 470 * |
| ANTIMONY | U | U | U | U | U | 7.9 J | U |
| ARSENIC | U | U | U | U | 0.85 J | 12 * | U |
| BARIUM | 15 J | 5 J | 3.5 J | 4 J | 8.5 J | 390 * | 21 J |
| BERYLLIUM | U | U | U | U | U | 0.98 J | U |
| CADMIUM | 0.24 J | U | U | U | 0.53 J | 3.7 J | U |
| CALCIUM | 150000 * | 14000 * | 2000 * | 2300 J | 17000 J | 43000 J | 8400 J |
| CHROMIUM, TOTAL | 8.5 * | 1.4 J | 0.84 J | 0.80 J | 1.7 J | 46 J | 3.4 * |
| COBALT | 0.35 J | U | U | U | 0.27 J | 4.5 J | U |
| COPPER | 7.7 J | 2.1 J | U | U | U | 190 * | U |
| IRON | 2500 J | 1100 J | 870 J | 590 * | 3100 * | 37000 * | 2100 * |
| LEAD | 32 * | 8.4 * | 3.9 * | 6.8 * | 36 * | 670 * | 25 * |
| MAGNESIUM | 1100 J | 150 J | 44 J | 150 J | 270 J | 2100 J | 380 J |
| MANGANESE | 78 J | 35 J | 3.3 J | 3.8 J | 27 * | 180 J | 14 J |
| NICKEL | 1.8 J | 0.49 J | U | U | 0.87 J | 33 J | 1.1 J |
| POTASSIUM | 130 J | 22 J | U | U | 36 J | 330 J | 37 J |
| SILVER | U | U | U | U | U | U | 0.88 J |
| SODIUM | 100 J | 84 J | U | U | 90 J | 270 J | U |
| VANADIUM | 5.4 J | 1.5 J | 0.87 J | 1.3 J | 2.2 J | 47 * | 2.3 J |
| ZINC | 35 * | 14 * | 7.8 * | 7.6 * | UJ | 1100 * | UJ |
| MERCURY | 0.029 J | 0.0076 J | 0.0075 J | U | 0.013 J | 0.81 * | 0.053 J |
| Pesticides (ug/KG) | | | | | | | |
| ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE) | UJ | R | U | U | U | 7.4 J | U |
| ALPHA-CHLORDANE | UJ | R | U | U | 0.62 J | 44 * | 2.3 J |
| BETA BHC (BETA HEXACHLOROCYCLOHEXANE) | UJ | R | U | U | U | 20 * | 8.1 J |
| DIELDRIN | UJ | R | U | U | U | 13 J | U |
| GAMMA-CHLORDANE | UJ | R | U | U | 1.6 J | 93 J | 3.9 J |
| p,p'-DDE | UJ | R | U | U | U | 18 * | U |
| p,p'-DDT | UJ | R | UJ | UJ | UJ | 45 J | UJ |
| Volatile Organic Compounds (ug/KG) | | | | | | | |
| ACETONE | | | 250 J | | | 1200 J | |
| CARBON DISULFIDE | | | 3.7 J | | | 23 J | |
| CHLOROBENZENE | | | U | | | 10 J | |
| METHYL ETHYL KETONE (2-BUTANONE) | | | 61 J | | | 500 * | |
| Semivolatile Organic Compounds (ug/KG) | | | | | | | |
| 4-BROMOPHENYL PHENYL ETHER | U | U | U | U | 87 J | U | U |
| ANTHRACENE | U | U | U | U | U | 180 J | 170 J |
| BENZO(a)ANTHRACENE | U | U | U | 45 J | U | 1100 J | 600 * |
| BENZO(a)PYRENE | 170 J | 240 J | U | 52 J | U | 1500 J | 810 * |
| BENZO(b)FLUORANTHENE | U | U | U | 54 J | U | U | 830 J |
| BENZO(g,h,i)PERYLENE | 130 J | 180 J | U | 34 J | U | 1200 J | U |
| BENZO(k)FLUORANTHENE | U | U | U | 38 J | U | 3000 * | 640 * |
| BENZYL BUTYL PHTHALATE | UJ | UJ | U | U | U | 240 J | U |
| bis(2-ETHYLHEXYL)PHTHALATE | 380 J | 280 J | U | 140 J | U | 4700 * | U |
| CARBAZOLE | U | 46 J | U | U | U | 160 J | U |
| CHRYSENE | U | U | U | 58 J | U | 2000 * | 780 * |
| CRESOLS, M&P | 320 J | U | U | U | U | U | U |
| DIBENZ(a,h)ANTHRACENE | U | 74 J | U | U | U | 430 J | U |
| Di-n-BUTYL PHTHALATE | U | 53 J | U | U | U | U | U |
| FLUORANTHENE | 210 J | 630 * | U | 180 J | U | 3100 * | 1800 * |
| INDENO(1,2,3-cd)PYRENE | 150 J | 200 J | U | U | U | 780 J | U |
| PHENANTHRENE | 42 J | 300 J | 84 J | 65 J | 34 J | 1100 J | 830 * |
| PYRENE | 340 J | 380 J | U | 120 J | U | 2900 * | 1200 * |
| Physical Characteristics (mg/KG) | | | | | | | |
| TOTAL ORGANIC CARBON | 9100 * | 1800 * | U | U | U | 190000 * | 5800 * |

AOC Samples; Screening for PCOPC Selection

| Parameter Name | Total Samples | Total Detections | Minimum Detected | Average Detected | Maximum Detected | Approved Screening Value | Total Detections > Screening Value | AOC Screening HQ Based on Maximum | Selected as PCOPC? |
|---|---|---|---|---|---|---|---|---|---|
| ADJUSTED TEQ OF 2,3,7,8-TCDD | 2 | 2 | 34.112 | 319.22 | 804.3364 | 2.5 | 2 | 241.73 | Yes |
| ALUMINUM | 7 | 7 | 280.00 | 1808.57 | 9100.00 | - | - | - | Yes |
| ANTIMONY | 7 | 1 | 2.90 | 2.90 | 2.90 | 2 | 1 | 1.45 | Yes |
| ARSENIC | 7 | 2 | 0.86 | 6.4 | 12.00 | 7.24 | 1 | 1.66 | Yes |
| BARIUM | 7 | 7 | 3.50 | 48.14 | 380.00 | - | - | - | Yes |
| BERYLLIUM | 7 | 1 | 0.98 | 0.98 | 0.98 | - | - | - | Yes |
| CADMIUM | 7 | 3 | 0.24 | 1.16 | 3.70 | 0.676 | 1 | 5.47 | Yes |
| CALCIUM | 7 | 7 | 2000.00 | 33814.29 | 150000.00 | - | - | - | Yes |
| CHROMIUM, TOTAL | 7 | 7 | 0.64 | 8.86 | 46.00 | 53.3 | 0 | 0.86 | No |
| COBALT | 7 | 3 | 0.27 | 1.71 | 4.50 | 50 | 0 | 0.09 | No |
| COPPER | 7 | 3 | 2.10 | 65.41 | 190.00 | 18.7 | 1 | 10.16 | Yes |
| IRON | 7 | 7 | 590.00 | 8680.40 | 37000.00 | - | - | - | Yes |
| LEAD | 7 | 7 | 3.90 | 111.87 | 670.00 | 30.2 | 3 | 22.19 | Yes |
| MAGNESIUM | 7 | 7 | 44.00 | 596.79 | 2100.00 | - | - | - | Yes |
| MANGANESE | 7 | 7 | 3.30 | 41.57 | 180.00 | - | - | - | Yes |
| NICKEL | 7 | 5 | 0.48 | 5.44 | 33.00 | 19.9 | 1 | 1.66 | Yes |
| POTASSIUM | 7 | 5 | 22.00 | 111.00 | 330.00 | - | - | - | Yes |
| SILVER | 7 | 1 | 0.86 | 0.86 | 0.86 | 0.733 | 1 | 1.17 | Yes |
| SODIUM | 7 | 4 | 84.00 | 136.00 | 270.00 | - | - | - | Yes |
| VANADIUM | 7 | 7 | 0.87 | 8.66 | 47.00 | - | - | - | Yes |
| ZINC | 7 | 5 | 7.80 | 232.28 | 1100.00 | 124 | 1 | 8.87 | Yes |
| MERCURY | 7 | 6 | 0.01 | 0.17 | 0.81 | 0.174 | 1 | 4.68 | Yes |
| ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE) | 7 | 1 | 7.40 | 7.40 | 7.40 | 6 | 1 | 1.23 | Yes |
| ALPHA-CHLORDANE | 7 | 3 | 0.62 | 15.61 | 44.00 | 0.5 | 3 | 88.00 | Yes |
| BETA BHC (BETA HEXACHLOROCYCLOHEXANE) | 7 | 2 | 8.10 | 14.05 | 20.00 | 71500 | 0 | 0.00 | No |
| DIELDRIN | 7 | 1 | 13.00 | 13.00 | 13.00 | 0.02 | 1 | 650.00 | Yes |
| GAMMA-CHLORDANE | 7 | 3 | 1.60 | 19.3 | 93.00 | 0.5 | 3 | 186.00 | Yes |
| p,p'-DDE | 7 | 1 | 18.00 | 18.00 | 18.00 | 2.07 | 1 | 8.70 | Yes |
| p,p'-DDT | 7 | 1 | 45.00 | 45.00 | 45.00 | 1.19 | 1 | 37.82 | Yes |
| ACETONE | 2 | 2 | 250.00 | 725.00 | 1200.00 | 453.37 | 1 | 2.65 | Yes |
| CARBON DISULFIDE | 2 | 2 | 3.70 | 13.35 | 23.00 | 133.97 | 0 | 0.17 | No |
| CHLOROBENZENE | 2 | 1 | 10.00 | 10.00 | 10.00 | 61.54 | 0 | 0.16 | No |
| METHYL ETHYL KETONE (2-BUTANONE) | 2 | 2 | 61.00 | 280.50 | 500.00 | 136.95 | 1 | 3.65 | Yes |
| 4-BROMOPHENYL PHENYL ETHER | 7 | 1 | 67.00 | 67.00 | 67.00 | 1550 | 0 | 0.04 | No |
| ANTHRACENE | 7 | 2 | 120.00 | 155.00 | 190.00 | 45.9 | 2 | 4.09 | Yes |
| BENZO(a)ANTHRACENE | 7 | 3 | 45.00 | 581.67 | 1100.00 | 74.8 | 2 | 14.71 | Yes |
| BENZO(a)PYRENE | 7 | 4 | 52.00 | 514.43 | 1500.00 | 88.8 | 4 | 16.89 | Yes |
| BENZO(b)FLUORANTHENE | 7 | 3 | 54.00 | 342.00 | 830.00 | 10400 | 0 | 0.08 | No |
| BENZO(g,h,i)PERYLENE | 7 | 3 | 34.00 | 386.00 | 1200.00 | 170 | 2 | 7.06 | Yes |
| BENZO(k)FLUORANTHENE | 7 | 4 | 38.00 | 1526.00 | 3000.00 | 240 | 3 | 12.50 | Yes |
| BENZYL BUTYL PHTHALATE | 7 | 1 | 240.00 | 240.00 | 240.00 | 4130 | 0 | 0.06 | No |
| bis(2-ETHYLHEXYL)PHTHALATE | 7 | 4 | 140.00 | 1377.50 | 4700.00 | 182 | 3 | 25.82 | Yes |
| CARBAZOLE | 7 | 2 | 46.00 | 118.00 | 190.00 | - | - | - | Yes |
| CHRYSENE | 7 | 3 | 59.00 | 945.33 | 2000.00 | 108 | 2 | 18.52 | Yes |
| CRESOLS, M&P | 7 | 1 | 320.00 | 320.00 | 320.00 | 0.808 | 1 | 396.04 | Yes |
| DIBENZ(a,h)ANTHRACENE | 7 | 2 | 74.00 | 252.00 | 430.00 | 6.22 | 2 | 69.13 | Yes |
| Di-n-BUTYL PHTHALATE | 7 | 1 | 53.00 | 53.00 | 53.00 | 110.5 | 0 | 0.48 | No |
| FLUORANTHENE | 7 | 5 | 180.00 | 1144.00 | 3100.00 | 113 | 5 | 27.43 | Yes |
| INDENO(1,2,3-cd)PYRENE | 7 | 3 | 150.00 | 376.67 | 780.00 | 200 | 1 | 3.90 | Yes |
| PHENANTHRENE | 7 | 7 | 34.00 | 324.14 | 1100.00 | 86.7 | 4 | 12.68 | Yes |
| PYRENE | 7 | 5 | 120.00 | 964.00 | 2900.00 | 153 | 4 | 18.95 | Yes |
| TOTAL ORGANIC CARBON | 7 | 4 | 1800.00 | 50875.00 | 190000.00 | | | | |

Refinement for Direct Exposure COPC Selection

| Parameter Name | Approved Refinement Value | Total Detections > Refinement Value | AOC Refinement HQ Based on Maximum | Selected as COPC? | Rationale for selection as COPEC |
|---|---|---|---|---|---|
| ADJUSTED TEQ OF 2,3,7,8-TCDD | 25 | 2 | 32.17 | Yes | HQ was above 1 |
| ALUMINUM | | | - | Yes | No refinement value |
| ANTIMONY | 25 | 0 | 0.12 | No | HQ was below 1 |
| ARSENIC | 17 | 0 | 0.71 | No | HQ was below 1 |
| BARIUM | 200 | 1 | 1.90 | Yes | Hot spot at FCSW012 |
| BERYLLIUM | - | - | - | Yes | No refinement value |
| CADMIUM | 3.5 | 0 | 0.77 | No | HQ was below 1 |
| CALCIUM | - | - | - | No | Essential nutrient |
| CHROMIUM, TOTAL | 96 | 0 | 0.51 | No | HQ was below 1 |
| COBALT | [redacted] | | | | |
| COPPER | 108 | 1 | 1.78 | Yes | Hot spot at FCSW012 |
| IRON | 20000 | 1 | 1.85 | Yes | Hot spot at FCSW012 |
| LEAD | 91.3 | 1 | 7.34 | Yes | Hot spot at FCSW012 |
| MAGNESIUM | - | - | - | No | Essential nutrient |
| MANGANESE | 490 | 0 | 0.38 | No | HQ was below 1 |
| NICKEL | 42.8 | 0 | 0.54 | No | HQ was below 1 |
| POTASSIUM | - | - | - | No | Essential nutrient |
| SILVER | 1.77 | 0 | 0.49 | No | HQ was below 1 |
| SODIUM | - | - | - | No | Essential nutrient |
| VANADIUM | - | - | - | Yes | No refinement value |
| ZINC | 270 | 1 | 4.07 | Yes | Hot spot at FCSW012 |
| MERCURY | 0.486 | 1 | 1.78 | Yes | Hot spot at FCSW012 |
| ALPHA BHC (ALPHA HEXACHLOROCYCLOHEXANE) | 6 | 1 | 1.23 | Yes | Hot spot at FCSW012 |
| ALPHA-CHLORDANE | 4.79 | 1 | 9.19 | Yes | Hot spot at FCSW012 |
| BETA BHC (BETA HEXACHLOROCYCLOHEXANE) | [redacted] | | | | |
| DIELDRIN | 4.3 | 1 | 3.02 | Yes | Hot spot at FCSW012 |
| GAMMA-CHLORDANE | 4.79 | 1 | 11.00 | Yes | Hot spot at FCSW012 |
| p,p'-DDE | 6.75 | 1 | 3.07 | Yes | Hot spot at FCSW012 |
| p,p'-DDT | 4.17 | 1 | 8.43 | Yes | Hot spot at FCSW012 |
| ACETONE | - | - | - | Yes | Hot spot at FCSW012 |
| CARBON DISULFIDE | [redacted] | | | | |
| CHLOROBENZENE | | | | | |
| METHYL ETHYL KETONE (2-BUTANONE) | - | - | - | Yes | Hot spot at FCSW012 |
| 4-BROMOPHENYL PHENYL ETHER | [redacted] | | | | |
| ANTHRACENE | 245 | 0 | 0.78 | No | HQ was below 1 |
| BENZO(a)ANTHRACENE | 385 | 2 | 2.86 | Yes | Hot spot at FCSW012 |
| BENZO(a)PYRENE | 763 | 1 | 1.97 | Yes | Hot spot at FCSW012 |
| BENZO(b)FLUORANTHENE | [redacted] | | | | |
| BENZO(g,h,i)PERYLENE | - | - | - | Yes | Hot spot at FCSW012 |
| BENZO(k)FLUORANTHENE | - | - | - | Yes | Hot spot at FCSW012 |
| BENZYL BUTYL PHTHALATE | [redacted] | | | | |
| bis(2-ETHYLHEXYL)PHTHALATE | 2647 | 1 | 1.78 | Yes | Hot spot at FCSW012 |
| CARBAZOLE | - | - | - | Yes | No refinement value |
| CHRYSENE | 846 | 1 | 2.36 | Yes | Hot spot at FCSW012 |
| CRESOLS, M&P | - | - | - | No | Low magnitude of exceedance |
| DIBENZ(a,h)ANTHRACENE | 135 | 1 | 3.19 | Yes | Hot spot at FCSW012 |
| Di-n-BUTYL PHTHALATE | [redacted] | | | | |
| FLUORANTHENE | 1494 | 2 | 2.07 | Yes | Hot spot at FCSW012 |
| INDENO(1,2,3-cd)PYRENE | 385 | 1 | 2.03 | Yes | Hot spot at FCSW012 |
| PHENANTHRENE | 515 | 2 | 2.14 | Yes | Hot spot at FCSW012 |
| PYRENE | 846 | 5 | 3.43 | Yes | Hot spot at FCSW012 |
| TOTAL ORGANIC CARBON | | | | | |

ROD Table 2

Table 2-5
Sediment Sample Results and Selection of PCOPEC and COPEC
Jacksonville Ash Superfund Site
Lonnie C. Miller, Jr. Park
Page 1 of 2

Samples from Areas of Expected Contamination

| Parameter Name | LMSW001 Result | Q | LMSW002 Result | Q | LMSW003 Result | Q | LMSW004 Result | Q | LMSW005 Result | Q | LMSW006 Result | Q | LMSW007 Result | Q | LMSW008 Result | Q | LMSW009 Result | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins (ng/KG)** | | | | | | | | | | | | | | | | | | |
| ADJUSTED TEQ OF 2378 TCDD | | | | | 80.04 | J | | | | | 95.80 | J | | | | | | |
| TEQ OF 2378 TCDD | | | | | | | | | | | | | | | | | | |
| **Inorganics (mg/KG)** | | | | | | | | | | | | | | | | | | |
| ALUMINUM | 1400 | * | 1500 | * | 11000 | * | 1600 | * | 2700 | * | 5500 | * | 2500 | * | 3300 | * | 870 | * |
| ANTIMONY | 1.7 | J | | UJ | | U | 5.1 | J | 2.1 | J | | UJ | | U | 18 | J | | U |
| ARSENIC | 2.7 | * | | U | | U | 10 | * | 5.7 | * | 6.4 | J | 2.3 | J | 12 | * | | U |
| BARIUM | 69 | * | 8.5 | J | 37 | J | 57 | J | 81 | * | 430 | * | 57 | J | 240 | * | 64 | * |
| BERYLLIUM | 0.077 | J | | U | 0.36 | J | | U | | U | 0.41 | J | 0.19 | J | 0.067 | J | | U |
| CADMIUM | 1 | J | | U | 0.47 | J | 2.9 | J | 1.3 | J | 3.2 | J | 0.45 | J | 2.3 | J | 0.35 | J |
| CALCIUM | 17000 | * | 950 | J | 14000 | * | 4700 | * | 7500 | * | 78000 | * | 3100 | * | 8500 | * | 2800 | * |
| CHROMIUM, TOTAL | 38 | * | 2.7 | J | 16 | * | 47 | * | 81 | * | 28 | * | 6.3 | * | 46 | * | 7.4 | * |
| COBALT | 0.91 | J | | U | | U | 5.3 | J | 1.1 | J | 2.6 | J | 0.87 | J | 3.7 | J | 0.43 | J |
| COPPER | 270 | * | 8.8 | J | 30 | * | 220 | * | 500 | * | 150 | * | 21 | * | 320 | * | 40 | |
| IRON | 4500 | * | 1600 | * | 11000 | * | 84000 | * | 11000 | * | 49000 | * | 1700 | * | 88000 | * | 8600 | |
| LEAD | 81 | * | 11 | J | 79 | * | 450 | * | 280 | * | 240 | * | 38 | * | 600 | * | 91 | * |
| MAGNESIUM | 270 | J | 210 | J | 1200 | J | 200 | J | 180 | J | 3400 | J | 290 | J | 670 | J | | UJ |
| MANGANESE | 33 | J | 8.3 | * | 34 | * | 280 | J | 58 | J | 210 | J | 24 | * | 310 | J | 26 | * |
| NICKEL | 10 | * | 0.99 | J | 4.7 | J | 53 | * | 23 | * | 18 | J | 3.1 | J | 50 | | 6.5 | J |
| POTASSIUM | 110 | J | 60 | J | 370 | J | 110 | J | 100 | J | 330 | J | 130 | J | 180 | J | 45 | J |
| SELENIUM | | U | | U | | U | | U | | U | | U | | U | 1.6 | * | | U |
| SILVER | 0.93 | J | | U | | U | 1.8 | J | 3.3 | J | 1.3 | J | | U | 3.4 | J | 0.57 | J |
| SODIUM | | U | | U | | U | | U | | U | | U | | U | 300 | J | | U |
| VANADIUM | 4.7 | J | 1.9 | J | 17 | J | 3.7 | J | 4.3 | J | 54 | * | 8 | J | [illegible] | J | 2.9 | J |
| ZINC | 750 | J | 37 | J | 180 | * | 370 | J | 790 | J | 240 | J | 84 | J | 730 | J | 85 | J |
| MERCURY | 0.36 | J | 0.07 | J | 0.11 | J | 0.1 | J | 0.29 | J | 0.38 | J | 0.073 | * | 0.43 | J | 0.041 | J |
| CYANIDE | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| **Pesticides (ug/KG)** | | | | | | | | | | | | | | | | | | |
| ALPHA CHLORDANE | | R | | UJ | | U | | UJ | | R | 13 | J | | UJ | | R | | U |
| GAMMA CHLORDANE | | R | | UJ | | U | | UJ | | R | 18 | J | | UJ | | R | | U |
| p,p'-DDD | | R | | UJ | | U | | UJ | | R | 6.5 | J | | UJ | | R | | U |
| p,p'-DDE | | R | | UJ | 1.6 | J | | UJ | | R | | UJ | | UJ | | R | | U |
| p,p'-DDT | | R | | UJ | | U | | UJ | | R | 5.3 | J | | UJ | | R | | U |
| **PCBs (ug/KG)** | | | | | | | | | | | | | | | | | | |
| PCB-1260 (AROCHLOR 1260) | | R | | UJ | | U | | UJ | | R | 250 | J | | UJ | | U | | UJ |
| **Volatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | | | | | |
| ACETONE | | | | | 200 | * | | | | | 1600 | * | | | | | 370 | * |
| CARBON DISULFIDE | | | | | 43 | J | | | | | | U | | | | | | U |
| METHYL ETHYL KETONE (2-BUTANONE) | | | | | 46 | J | | | | | 630 | * | | | | | 120 | * |
| **Semivolatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | | | | | |
| ANTHRACENE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |
| BENZO(a)ANTHRACENE | | U | | U | | U | | UJ | | U | | U | | U | 35 | J | | U |
| BENZO(a)PYRENE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |
| BENZO(b)FLUORANTHENE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |
| BENZO(g,h,i)PERYLENE | | U | | U | | U | | UJ | | U | 130 | J | | U | | U | | U |
| BENZO(k)FLUORANTHENE | | U | 67 | J | | U | | UJ | | U | | U | | U | | U | | U |
| BENZYL BUTYL PHTHALATE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |
| bis(2-ETHYLHEXYL)PHTHALATE | 100 | J | | U | | U | 2800 | J | 170 | J | 1700 | | | U | [illegible] | J | | U |
| CARBAZOLE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |
| CHRYSENE | | U | | U | | U | | UJ | | U | 180 | J | | U | 38 | J | | U |
| DIBENZ(a,h)ANTHRACENE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |
| DIETHYL PHTHALATE | | U | | U | | U | | UJ | | U | | U | 60 | J | | U | | U |
| DI-n-BUTYL PHTHALATE | | U | 67 | J | | U | | UJ | | U | | U | 180 | J | | U | | U |
| FLUORANTHENE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |
| INDENO(1,2,3-cd)PYRENE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |
| PHENANTHRENE | | U | | U | | U | | UJ | | U | | U | | U | [illegible] | | | U |
| PYRENE | | U | | U | | U | | UJ | | U | | U | | U | | U | | U |

| Parameter Name | LMSW010 Result | Q | LMSW011 Result | Q | LMSW012 Result | Q | LMSW013 Result | Q | LMSW014 Result | Q | LMSW015 Result | Q | LMSW016 Result | Q | LMSW017 Result | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins (ng/KG)** | | | | | | | | | | | | | | | | |
| ADJUSTED TEQ OF 2378 TCDD | | | | | | | 153.54 | * | | | | | | | | |
| TEQ OF 2378 TCDD | | | | | | | | | | | | | | | | |
| **Inorganics (mg/KG)** | | | | | | | | | | | | | | | | |
| ALUMINUM | 1200 | * | 1600 | * | 2300 | | 1700 | * | 3200 | | 4500 | * | 3100 | | 5700 | * |
| ANTIMONY | 1.6 | J | | UJ | | UJ | | UJ | | U | | UJ | | UJ | | UJ |
| ARSENIC | 4.5 | * | 13 | * | 17 | * | | U | 2.3 | J | 2.3 | J | 1.8 | J | 3.9 | J |
| BARIUM | 130 | * | 490 | J | 380 | | 4 | J | 36 | J | 39 | J | 28 | J | 36 | J |
| BERYLLIUM | 0.11 | J | 0.22 | J | | U | | U | 0.2 | J | 0.23 | J | 0.18 | J | 0.38 | J |
| CADMIUM | 1.2 | J | 0.85 | J | 1.3 | | | U | 0.59 | J | 0.67 | J | 0.42 | J | 0.68 | J |
| CALCIUM | 3200 | * | 5400 | * | 13000 | * | 17000 | * | 12000 | J | 5200 | J | 5600 | J | 4800 | * |
| CHROMIUM, TOTAL | 29 | * | 15 | * | 46 | | 2.3 | J | 6.7 | J | 13 | | 5.3 | * | 18 | * |
| COBALT | 1.7 | J | 1.6 | J | | U | 0.48 | J | 1.5 | J | 1.3 | J | 0.86 | J | 1.5 | J |
| COPPER | 110 | * | 110 | * | 160 | J | 2.5 | J | 22 | J | 29 | * | 23 | | 30 | * |
| IRON | 18000 | * | 140000 | * | 110000 | J | 1500 | | 1600 | J | 11000 | * | 8100 | * | 13000 | * |
| LEAD | 110 | J | 130 | J | 180 | J | 8.4 | * | 38 | J | 52 | J | 47 | J | 78 | J |
| MAGNESIUM | 190 | J | 1500 | J | 4400 | J | 460 | J | 2100 | J | 2500 | J | 1400 | * | 3300 | J |
| MANGANESE | 31 | * | 210 | * | 290 | J | 13 | * | 47 | J | 30 | * | 36 | * | 90 | * |
| NICKEL | 9.7 | J | 13 | J | 17 | J | 5 | J | 5.3 | J | 5.8 | J | 4.3 | J | 7.6 | J |
| POTASSIUM | 77 | J | 240 | J | 1100 | J | 70 | J | 210 | J | 170 | J | 430 | J | 1100 | J |
| SELENIUM | | U | | U | | U | | U | | U | | U | | U | | U |
| SILVER | 0.89 | J | 0.81 | J | 1.8 | J | | U | | U | | U | | U | | U |
| SODIUM | | U | 3200 | J | 13000 | | 1000 | J | 6300 | * | 1400 | * | 3000 | | 8400 | * |
| VANADIUM | 5.4 | J | 11 | J | 26 | J | 2.2 | J | 2.6 | | 9.5 | J | 2.7 | J | [illegible] | J |
| ZINC | 240 | J | 360 | J | 340 | J | 11 | * | 130 | * | 180 | J | 130 | J | 180 | J |
| MERCURY | 0.32 | | 0.23 | J | 0.25 | J | 0.011 | J | | U | 0.06 | J | 0.077 | J | 0.11 | J |
| CYANIDE | | U | 2 | J | | U | | U | | U | | U | | U | | U |
| **Pesticides (ug/KG)** | | | | | | | | | | | | | | | | |
| ALPHA CHLORDANE | | R | | R | | U | | U | | U | | UJ | | UJ | | UJ |
| GAMMA CHLORDANE | | R | | R | | U | | U | | U | | UJ | | UJ | | UJ |
| p,p'-DDD | | R | | R | | U | | UJ | | U | | UJ | | UJ | | UJ |
| p,p'-DDE | | R | | R | | U | | UJ | | U | | UJ | | UJ | | UJ |
| p,p'-DDT | | R | | R | | U | | U | | U | | UJ | | UJ | | UJ |
| **PCBs (ug/KG)** | | | | | | | | | | | | | | | | |
| PCB-1260 (AROCHLOR 1260) | | R | | R | | U | | U | | U | | UJ | | UJ | | UJ |
| **Volatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | | | |
| ACETONE | | | | | | | [illegible] | * | | | 200 | * | | | | |
| CARBON DISULFIDE | | | | | | | 4.7 | J | | | 33 | J | | | | |
| METHYL ETHYL KETONE (2-BUTANONE) | | | | | | | 22 | | | | 47 | | | | | |
| **Semivolatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | | | |
| ANTHRACENE | | U | | U | | U | 65 | J | | U | | U | | U | | U |
| BENZO(a)ANTHRACENE | | U | 76 | J | 140 | J | 750 | | 240 | J | 170 | J | 210 | J | 78 | J |
| BENZO(a)PYRENE | | U | | U | 150 | J | 780 | | 260 | J | 190 | J | 300 | J | 120 | J |
| BENZO(b)FLUORANTHENE | | U | 130 | J | 240 | J | 960 | | 340 | J | 240 | J | 290 | J | 190 | J |
| BENZO(g,h,i)PERYLENE | | U | | U | | U | 550 | J | 250 | J | 180 | J | 250 | | | U |
| BENZO(k)FLUORANTHENE | | U | | U | 170 | J | 800 | | 340 | J | 220 | J | 300 | J | | U |
| BENZYL BUTYL PHTHALATE | [illegible] | J | | U | | U | | U | | U | | U | | U | | U |
| bis(2-ETHYLHEXYL)PHTHALATE | 710 | * | | U | 1400 | J | 250 | J | 650 | | 1100 | | 360 | J | 1900 | * |
| CARBAZOLE | | U | | U | | U | 80 | J | | U | | U | | U | | U |
| CHRYSENE | | U | [illegible] | J | 210 | * | 1000 | * | 460 | J | 300 | J | 390 | J | 140 | J |
| DIBENZ(a,h)ANTHRACENE | | U | | U | | U | 120 | J | | U | | U | | U | | U |
| DIETHYL PHTHALATE | | U | | U | | U | | U | | U | | U | | U | | U |
| DI-n-BUTYL PHTHALATE | [illegible] | J | 120 | J | | U | | U | | U | | U | [illegible] | J | | U |
| FLUORANTHENE | | U | | U | 250 | J | 1300 | | 540 | J | 220 | J | 570 | J | 150 | J |
| INDENO(1,2,3-cd)PYRENE | | U | | U | | U | 440 | J | 230 | J | | U | 200 | J | | U |
| PHENANTHRENE | | U | | U | | U | 480 | | 160 | J | 94 | J | 170 | J | | U |
| PYRENE | | U | | U | | U | 1500 | | 660 | J | 440 | J | 580 | J | | U |

| Parameter Name | LMSW018 Result | Q | LMSW019 Result | Q | LMSW020 Result | Q | LMSW021 Result | Q | LMSW022 Result | Q | LMSW023 Result | Q | LMSW024 Result | Q | LMSW025 Result | Q | LMSW026 Result | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins (ng/KG)** | | | | | | | | | | | | | | | | | | |
| ADJUSTED TEQ OF 2378 TCDD | | | | | 644.84 | * | | | | | | | | | | | 192.13 | J |
| TEQ OF 2378 TCDD | | | | | | | | | 20.77 | * | | | | | | | | |
| **Inorganics (mg/KG)** | | | | | | | | | | | | | | | | | | |
| ALUMINUM | 3000 | | 11000 | * | 5200 | * | 10000 | * | 5000 | * | 15000 | * | 14000 | * | 14000 | * | 15000 | * |
| ANTIMONY | | U | | U | | UJ | | UJ | 1.7 | J | | UJ | | UJ | | U | | U |
| ARSENIC | | U | 6.1 | J | 2.3 | J | 4.1 | J | 3.9 | J | 6.1 | J | 5 | J | 5.2 | J | 8 | J |
| BARIUM | 31 | J | 64 | J | 36 | J | 81 | J | 33 | J | 89 | J | 130 | J | 110 | J | 67 | J |
| BERYLLIUM | 0.24 | J | 0.64 | J | 0.34 | J | 0.61 | J | 0.37 | J | 0.87 | J | 0.73 | J | 0.76 | J | 0.88 | J |
| CADMIUM | | U | 1.3 | J | 0.61 | J | 1.2 | J | 0.37 | J | 2.6 | J | 2.3 | J | 1.8 | J | 1.7 | * |
| CALCIUM | 54000 | J | 5500 | J | 3600 | J | 6700 | J | 24000 | J | 11000 | J | 7800 | J | 8500 | J | 8300 | J |
| CHROMIUM, TOTAL | 5.2 | J | 28 | J | 12 | * | 27 | * | 10 | * | 63 | * | 37 | * | 38 | * | 43 | J |
| COBALT | 0.7 | J | 1.7 | J | 1.4 | J | 2.5 | J | 1.7 | J | 3.1 | J | 3.4 | J | 3.3 | J | 2.9 | J |
| COPPER | 5.9 | J | 38 | J | 20 | * | 41 | * | 15 | J | 80 | * | 71 | | 60 | * | 57 | J |
| IRON | 1500 | J | 16000 | J | 8700 | | 17000 | * | 11000 | * | 24000 | * | 21000 | * | 19000 | * | 26000 | J |
| LEAD | 12 | J | 73 | J | 41 | J | 77 | J | 120 | J | 170 | J | 180 | J | 120 | J | 68 | J |
| MAGNESIUM | 2400 | J | 4600 | * | 2000 | * | 3800 | * | 3300 | J | 6400 | * | 4900 | * | 4400 | * | 8700 | * |
| MANGANESE | 84 | J | 120 | J | 47 | * | 140 | * | 84 | * | 160 | * | 130 | * | 190 | J | 250 | J |
| NICKEL | 1.9 | J | 9.9 | J | 4.7 | J | 9.7 | J | 4.4 | J | 18 | J | 18 | J | 13 | J | 13 | J |
| POTASSIUM | 540 | J | 1700 | J | 730 | J | 1700 | J | 760 | J | 2000 | J | 1500 | J | 1400 | J | 2400 | J |
| SELENIUM | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| SILVER | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| SODIUM | 7000 | * | 13000 | * | 5300 | * | 7900 | * | 7400 | * | 13000 | * | 10000 | * | 8500 | * | 70000 | J |
| VANADIUM | 5 | J | 18 | J | 9.6 | J | 13 | J | 8.8 | J | 23 | J | 20 | J | 23 | J | 25 | J |
| ZINC | 33 | * | 240 | * | 140 | J | 250 | J | 71 | J | 350 | J | 330 | J | 340 | J | 300 | * |
| MERCURY | | U | 0.17 | J | 0.071 | J | 0.17 | J | 0.13 | J | 0.28 | J | 0.24 | J | 0.23 | J | 0.22 | J |
| CYANIDE | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| **Pesticides (ug/KG)** | | | | | | | | | | | | | | | | | | |
| ALPHA CHLORDANE | | U | | U | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ |
| GAMMA CHLORDANE | | U | | U | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ |
| p,p'-DDD | | U | | U | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ |
| p,p'-DDE | | U | | U | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ |
| p,p'-DDT | | U | | U | 7.3 | J | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ |
| **PCBs (ug/KG)** | | | | | | | | | | | | | | | | | | |
| PCB-1260 (AROCHLOR 1260) | | U | | U | | UJ | | UJ | | UJ | | UJ | | UJ | | UJ | | U |
| **Volatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | | | | | |
| ACETONE | | | | | 120 | * | | | 190 | * | | | | | | | 500 | * |
| CARBON DISULFIDE | | | | | 4.8 | J | | | 23 | J | | | | | | | | U |
| METHYL ETHYL KETONE (2-BUTANONE) | | | | | 26 | * | | | 40 | J | | | | | | | 120 | J |
| **Semivolatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | | | | | |
| ANTHRACENE | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| BENZO(a)ANTHRACENE | | U | | U | 110 | J | | U | | U | | U | | U | | U | | U |
| BENZO(a)PYRENE | | U | 150 | J | 120 | J | | U | | U | | U | | U | | U | | U |
| BENZO(b)FLUORANTHENE | | U | | U | 120 | J | | U | | U | | U | | U | 380 | J | | U |
| BENZO(g,h,i)PERYLENE | | U | 180 | J | 87 | J | | U | | U | | U | | U | | U | | U |
| BENZO(k)FLUORANTHENE | | U | | U | 110 | J | | U | | U | | U | | U | | U | | U |
| BENZYL BUTYL PHTHALATE | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| bis(2-ETHYLHEXYL)PHTHALATE | | U | | U | 180 | J | | U | 190 | J | 210 | J | 230 | J | 830 | J | 480 | J |
| CARBAZOLE | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| CHRYSENE | | U | | U | 170 | J | 100 | J | | U | | U | | U | 300 | J | 150 | * |
| DIBENZ(a,h)ANTHRACENE | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| DIETHYL PHTHALATE | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| DI-n-BUTYL PHTHALATE | | U | | U | | U | | U | 110 | J | | U | 250 | J | 150 | J | 210 | J |
| FLUORANTHENE | | U | | U | 220 | J | | U | | U | | U | | U | 340 | J | | U |
| INDENO(1,2,3-cd)PYRENE | | U | | U | | U | | U | | U | | U | | U | | U | | U |
| PHENANTHRENE | | U | | U | [illegible] | J | | U | | U | | U | | U | 94 | J | | U |
| PYRENE | | U | | U | 190 | J | | U | | U | | U | | U | 410 | J | | U |

ROD Table 3

Notes:
J Estimated value
R Data was rejected
Samples shown in yellow exceed screening value
Samples shown in orange exceed reference value

**Table 2-5**
**Sediment Sample Results and Selection of PCOPEC and COPEC**
***Jacksonville Ash Superfund Site***
**Lonnie C. Miller, Jr. Park**
**Page 2 of 2**

| Parameter Name | Ash Samples: Total Samples | Total Detections | Minimum Detected | Average Detected | Maximum Detected | Screening-Level PCOPEC Selection: Approved Screening Value | Total Detections > Screening | Max Screening HQ Based on Maximum | Selected as PCOPEC? | Refinement by Direct Exposure COPEC Selection: Approved Refinement Value | Total Detections > Refinement Value | Max Refinement HQ Based on Maximum | Selected as COPEC? | Rationale for selection as COPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Dioxins (ng/KG)** | | | | | | | | | | | | | | |
| ADJUSTED TEQ OF 2,3,7,8-TCDD | 5 | 5 | 60.04 | 253.12 | 144.84 | 2.5 | 5 | 57.94 | Yes | 2.5 | 5 | 25.78 | Yes | HQ was above 1 |
| TEQ OF 2,3,7,8-TCDD | 1 | 1 | 2.07721 | 2.08 | 2.07721 | 2.5 | 0 | 0.83 | No | | | | | |
| **Inorganics (mg/KG)** | | | | | | | | | | | | | | |
| ALUMINUM | 26 | 26 | 620 | 9288.08 | 15000 | | | | Yes | 600 (a) | 26 | 25.00 | Yes | HQ was above 1 |
| ANTIMONY | 26 | 6 | 1.7 | 4.95 | 16 | 2 | 3 | 9.00 | Yes | 25 | 0 | 0.72 | No | HQ was below 1 |
| ARSENIC | 26 | 21 | 1.8 | 5.88 | 17 | 7.24 | 5 | 2.35 | Yes | 17 | 1 | 1.00 | No | Low magnitude and frequency of exceedance |
| BARIUM | 26 | 26 | 4 | 115.16 | 630 | | | | Yes | 200 | 4 | 3.15 | No | Low magnitude of exceedance |
| BERYLLIUM | 26 | 20 | 0.077 | 0.35 | 0.88 | | | - | Yes | 1.1 (a) | 0 | 0.80 | No | HQ was below 1 |
| CADMIUM | 26 | 23 | 0.37 | 1.30 | 3.2 | 0.676 | 15 | 4.73 | Yes | 3.5 | 0 | 0.91 | No | HQ was below 1 |
| CALCIUM | 26 | 26 | 960 | 10369.62 | 54000 | | | | Yes | - | - | | No | Essential nutrient |
| CHROMIUM, TOTAL | 26 | 26 | 7.3 | 23.87 | 61 | 52.3 | 2 | 1.17 | Yes | 91 | 0 | 0.64 | No | HQ was below 1 |
| COBALT | 26 | 23 | 0.43 | 2.58 | 15 | 50 | 0 | 0.30 | No | | | | | |
| COPPER | 26 | 26 | 2.5 | 93.96 | 500 | 18.7 | 22 | 26.74 | Yes | 108 | 8 | 4.63 | Yes | HQ was above 1 |
| IRON | 26 | 26 | 1300 | 27862.23 | 140000 | | | | Yes | 20000 | 6 | 7.00 | Yes | HQ was above 1 |
| LEAD | 26 | 26 | 8.4 | 138.86 | 400 | 30.2 | 23 | 19.87 | Yes | 61.3 | 11 | 6.57 | Yes | HQ was above 1 |
| MAGNESIUM | 26 | 25 | 180 | 2503.60 | 8200 | | | - | Yes | - | | | No | Essential nutrient |
| MANGANESE | 26 | 26 | 8.3 | 110.06 | 290 | | | | Yes | 460 | 0 | 0.63 | No | HQ was below 1 |
| NICKEL | 26 | 26 | 0.95 | 12.35 | 57 | 15.9 | 7 | 3.77 | Yes | 47.8 | 7 | 1.21 | No | Low magnitude and frequency of exceedance |
| POTASSIUM | 26 | 26 | 45 | 771.12 | 2400 | | | - | Yes | | | - | No | Essential nutrient |
| SELENIUM | 26 | 1 | 1.6 | 1.60 | 1.6 | - | - | | Yes | 0.81 (a) | 1 | 1.98 | No | Low magnitude and frequency of exceedance |
| SILVER | 26 | 9 | 0.52 | 1.12 | 3.4 | 0.733 | 8 | 4.64 | Yes | 1.87 | 3 | 1.82 | No | Low magnitude and frequency of exceedance |
| SODIUM | 26 | 17 | 300 | 2670.59 | 20000 | | | | Yes | | | - | No | Essential nutrient |
| VANADIUM | 26 | 26 | 1.9 | 13.05 | 54 | - | | | Yes | 130 (a) | 0 | 0.42 | No | HQ was below 1 |
| ZINC | 26 | 26 | 32 | 277.12 | 750 | 124 | 20 | 6.05 | Yes | 270 | 11 | 2.78 | Yes | HQ was above 1 |
| MERCURY | 26 | 24 | 0.011 | 0.17 | 0.45 | 0.13 | 11 | 3.46 | Yes | 0.486 | 0 | 0.93 | No | HQ was below 1 |
| CYANIDE | 26 | 1 | 2 | 2.00 | 2 | 0.0001 | 1 | 20000.00 | Yes | 1 | 1 | 2.00 | No | Low magnitude and frequency of exceedance |
| **Pesticides (ug/KG)** | | | | | | | | | | | | | | |
| ALPHA CHLORDANE | 26 | 1 | 13 | 13 | 13 | 0.5 | 1 | 26.00 | Yes | 4.79 | 1 | 2.71 | No | Low magnitude and frequency of exceedance |
| GAMMA CHLORDANE | 26 | 1 | 16 | 16 | 16 | 0.5 | 1 | 16.00 | Yes | 4.79 | 1 | 3.87 | No | Low magnitude and frequency of exceedance |
| p,p'-DDD | 26 | 1 | 5.5 | 5.5 | 5.5 | 1.22 | 1 | 4.51 | Yes | 7.81 | 0 | 0.70 | No | HQ was below 1 |
| p,p'-DDE | 26 | 1 | 1.6 | 1.6 | 1.6 | 2.07 | 0 | 0.77 | No | | | | | |
| p,p'-DDT | 26 | 2 | 5.7 | 6.1 | 7.3 | 1.19 | 2 | 6.13 | Yes | 4.77 | 2 | 1.53 | No | Low magnitude and frequency of exceedance |
| **PCBs (ug/KG)** | | | | | | | | | | | | | | |
| PCB-1260 (AROCHLOR 1260) | 26 | 1 | 250 | 250 | 250 | 34.1 | 1 | 7.33 | Yes | 189 | 1 | 1.32 | No | Low magnitude and frequency of exceedance |
| **Volatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | |
| ACETONE | 8 | 8 | 17 | [illegible] | [illegible] | [illegible] | 2 | 3.51 | Yes | [illegible] | 2 | 3.53 | No | Low magnitude and frequency of exceedance |
| CARBON DISULFIDE | 8 | 5 | 4.7 | 17.2 | 33 | [illegible] | 0 | [illegible] | No | | | | | |
| METHYL ETHYL KETONE (2-BUTANONE) | 8 | 8 | 22 | [illegible] | [illegible] | [illegible] | 1 | [illegible] | Yes | [illegible] | 1 | 4.60 | No | Low magnitude and frequency of exceedance |
| **Semivolatile Organic Compounds (ug/KG)** | | | | | | | | | | | | | | |
| ANTHRACENE | 26 | 1 | 65 | 65 | 65 | [illegible] | 1 | 1.39 | Yes | 245 | 0 | 0.27 | No | HQ was below 1 |
| BENZO(a)ANTHRACENE | 26 | 9 | [illegible] | [illegible] | [illegible] | [illegible] | 8 | [illegible] | Yes | [illegible] | 1 | 1.95 | No | Low magnitude and frequency of exceedance |
| BENZO(a)PYRENE | 26 | 8 | 120 | [illegible] | [illegible] | [illegible] | 8 | 8.78 | Yes | [illegible] | 1 | 1.02 | No | Low magnitude and frequency of exceedance |
| BENZO(b)FLUORANTHENE | 26 | 6 | 110 | [illegible] | 840 | [illegible] | 0 | [illegible] | No | | | | | |
| BENZO(g,h,i)PERYLENE | 26 | 7 | [illegible] | [illegible] | [illegible] | 170 | 1 | 3.24 | Yes | 170 | 1 | 3.24 | Yes | HQ was above 1 |
| BENZO(k)FLUORANTHENE | 26 | 7 | [illegible] | [illegible] | [illegible] | 240 | 1 | 1.11 | Yes | 240 | 1 | 1.11 | Yes | HQ was above 1 |
| BUTYL BENZYL PHTHALATE | 26 | 1 | 54 | 54 | 54 | [illegible] | 0 | [illegible] | No | | | | | |
| bis(2-ETHYLHEXYL) PHTHALATE | 26 | 19 | [illegible] | [illegible] | [illegible] | [illegible] | 14 | [illegible] | Yes | [illegible] | 1 | 1.06 | No | Low magnitude and frequency of exceedance |
| CARBAZOLE | 26 | 1 | 86 | 86 | 86 | | | | Yes | | | | No | Low frequency of occurance |
| CHRYSENE | 26 | 13 | [illegible] | [illegible] | [illegible] | [illegible] | 10 | [illegible] | Yes | [illegible] | 1 | 1.18 | No | Low magnitude and frequency of exceedance |
| DIBENZ(a,h)ANTHRACENE | 26 | 1 | [illegible] | [illegible] | [illegible] | [illegible] | 1 | [illegible] | Yes | [illegible] | 0 | [illegible] | No | HQ was below 1 |
| DIETHYL PHTHALATE | 26 | 1 | 60 | 60 | 60 | [illegible] | 1 | [illegible] | Yes | [illegible] | 1 | 7.46 | No | Low frequency of occurance |
| DI-n-BUTYL PHTHALATE | 26 | 6 | [illegible] | [illegible] | [illegible] | [illegible] | 5 | [illegible] | Yes | [illegible] | 1 | 2.78 | No | Low magnitude and frequency of exceedance |
| FLUORANTHENE | 26 | 8 | 150 | [illegible] | 1300 | [illegible] | 8 | 11.50 | Yes | [illegible] | 0 | 0.87 | No | HQ was below 1 |
| INDENO(1,2,3-c,d)PYRENE | 26 | 3 | 200 | [illegible] | 410 | [illegible] | 1 | [illegible] | Yes | 200 | 1 | 2.30 | No | Low magnitude and frequency of exceedance |
| PHENANTHRENE | 26 | 7 | [illegible] | [illegible] | 490 | [illegible] | 5 | [illegible] | Yes | [illegible] | 0 | [illegible] | No | HQ was below 1 |
| PYRENE | 26 | 6 | 190 | [illegible] | [illegible] | [illegible] | 6 | [illegible] | Yes | [illegible] | 1 | 1.71 | No | Low magnitude and frequency of exceedance |

ROD Table 3

## 3.6 Surface Water Contamination

### 3.6.1 Forest Street Incinerator

Surface drainage at the Forest Street Incinerator site generally flows northward overland in drainageways along streets, in storm water collection systems, and swales into McCoy Creek, located approximately 100 to 150 feet north of the site. McCoy Creek is a tributary of the St. Johns River, located approximately one mile east of the site.

During RI sampling events in 2000, a total of 8 downstream surface water samples and 7 upstream background samples were obtained from McCoy's Creek. The 15 surface water samples were analyzed for TAL and TCL parameters. One of the upstream background samples was found to be downstream of an ash deposit located adjacent to the creek. This sample was eliminated from the background calculation of background surface water and sediment concentrations.

Ten metals were detected in surface water: barium, cadmium, copper, cyanide, iron, lead, manganese, mercury, vanadium, and zinc. Of these, only cadmium and cyanide exceeded screening criteria from the Region 4 Ecological Risk Assessment Bulletins. Cadmium exceeded the screening criteria in the most downstream surface water sample. Cadmium is not believed to be related to discharge of groundwater from the site to McCoy Creek because it was not detected in any of the 22 groundwater monitoring wells.

Cyanide concentrations in McCoy's Creek exceeded the screening threshold criteria of 0.0052 mg/L at 4 locations (FSSW002, FSSW003, FSSW006 and FSSW008). At all 4 locations, cyanide only marginally exceeds the detection limit of 0.005 mg/L. At each of these locations, potassium and sodium are much higher than other surface water samples, possibly indicative of more saline water from tidal waters. Cyanide is not believed to be related to the site because it was detected in only 1 of the 20 downgradient monitoring wells. At that well (FSMW005), cyanide was detected at an estimated concentration of 0.0073 mg/L, which is far below the groundwater screening criteria of 0.2 mg/L.

The only organic compound were detected in surface water at concentrations exceeding screening criteria was bis(2-ehtylhexyl)phthalate, which was detected in FSSW008 at 2 ug/l. A variety of SVOCs were detected at concentrations below quantitation limits, primarily in one sample (FSSW004).

Table 4 lists the constituents detected by surface water analysis.

### 3.6.2 5th and Cleveland Incinerator

Surface drainage generally flows northeast to a channelized subsurface unnamed creek. The unnamed creek flows to the east of the site and discharges into Hogan Creek about 0.5 mile downstream, which subsequently discharges into the St. Johns River.

During RI sampling events in 2000, a total of 10 surface water samples were obtained from the drainage ditch, underground culvert and Hogan's Creek. All 10 samples were analyzed for TAL

Table 2-6
Surface Water Sample Results and Selection of PCOPEC and COPEC
Forest Street Site
Jacksonville Ash Superfund Site
Page 1 of 1

| Parameter Name | FSSW001 Result | Q | FSSW032 Result | Q | FSSW003 Result | Q | FSSW004 Result | Q | FSSW005 Result | Q | FSSW006 Result | Q | FSSW007 Result | Q | FSSW008 Result | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Samples from Areas of Expected Contamination | | | | | | | | | | | | | | | |
| **Inorganics (mg/L)** | | | | | | | | | | | | | | | | |
| BARIUM | 0.065 | J | 0.06 | J | 0.052 | J | 0.058 | J | 0.08 | J | 0.048 | J | 0.061 | J | 0.044 | J |
| CADMIUM | | U | | U | | U | | U | | U | | U | | U | 0.0048 | J |
| Cadmium, Dissolved | | U | | U | | U | | U | | U | | U | | U | | U |
| CALCIUM | 77 | = | 130 | = | 150 | = | 73 | = | 120 | = | 180 | = | 94 | = | 150 | = |
| Calcium, Dissolved | 78 | = | 130 | = | 150 | = | 78 | = | 140 | = | 180 | = | 85 | = | 170 | = |
| COPPER | | U | | U | | U | | U | | U | | U | | U | 0.003 | J |
| Copper, Dissolved | | U | | U | | U | | U | | U | | U | | U | | U |
| IRON | 0.42 | = | 0.39 | = | 0.47 | = | 0.35 | = | 0.35 | = | 0.37 | = | 0.4 | = | 0.33 | = |
| MAGNESIUM | 28 | = | 280 | = | 400 | = | 29 | = | 250 | = | 450 | = | 130 | = | 400 | = |
| Magnesium, Dissolved | 46 | = | 300 | = | 400 | = | 34 | = | 330 | = | 470 | = | 120 | = | 470 | = |
| MANGANESE | 0.081 | = | 0.079 | = | 0.089 | = | 0.057 | = | 0.071 | = | 0.053 | = | 0.08 | = | 0.046 | = |
| POTASSIUM | 8.4 | = | 110 | = | 140 | J | 8.7 | J | 80 | J | 180 | J | 45 | J | 150 | J |
| Potassium, Dissolved | 18 | = | 110 | = | 140 | J | 10 | J | 120 | J | 170 | J | 40 | J | 150 | J |
| SODIUM | 130 | = | 2200 | = | 2900 | = | 140 | = | 1800 | = | 3400 | = | 1000 | = | 3400 | = |
| Sodium, Dissolved | 290 | J | 2300 | J | 3000 | = | 170 | = | 2400 | = | 3500 | = | 900 | = | 1200 | |
| VANADIUM | | U | | U | 0.0056 | J | | U | | U | | U | | U | | U |
| ZINC | 0.008 | J | 0.018 | J | 0.0081 | J | | U | 0.0095 | J | 0.0091 | J | 0.018 | J | 0.0048 | J |
| CYANIDE | | U | 0.0065 | = | 0.0058 | J | | UJ | | UJ | 0.0088 | J | | UJ | 0.0076 | J |
| **Volatile Organic Compounds (ug/L)** | | | | | | | | | | | | | | | | |
| 1,2,4-TRICHLOROBENZENE | | U | | | | | | | | U | | | 3.6 | J | | |
| **Semivolatile Organic Compounds (ug/L)** | | | | | | | | | | | | | | | | |
| BENZO(a)ANTHRACENE | | U | | U | | UJ | 2 | J | | U | 0.63 | J | | U | | U |
| BENZO(a)PYRENE | | U | | J | | UJ | 2.7 | J | | U | | U | | U | | U |
| BENZO(b)FLUORANTHENE | | U | | UJ | | UJ | 2.2 | J | | U | | U | | U | | U |
| BENZO(g,h,i)PERYLENE | 0.7 | J | | U | | UJ | 2.1 | J | | U | | U | | U | | U |
| BENZO(k)FLUORANTHENE | | U | | U | | UJ | 1.7 | J | | U | | U | | U | | U |
| BENZYL BUTYL PHTHALATE | | U | | J | | UJ | 2 | J | | U | | U | | U | | U |
| bis(2-ETHYLHEXYL) PHTHALATE | | U | | J | 10 | J | | U | | U | | U | | U | | U |
| CARBAZOLE | | U | | J | | U | 2 | J | | U | | U | | U | | U |
| CHRYSENE | | U | | J | | UJ | 2.2 | J | | U | 0.53 | J | | U | | U |
| DIBENZ(a,h)ANTHRACENE | | U | | J | | UJ | 1.1 | J | | U | | U | | U | | U |
| Di-n-BUTYL PHTHALATE | | U | | U | | UJ | 1 | J | | U | | U | | U | | U |
| Di-n-OCTYL PHTHALATE | | U | | U | | UJ | 1.5 | J | | U | | U | | U | | U |
| FLUORANTHENE | | U | | J | | UJ | 2 | J | | U | | U | | U | | U |
| INDENO(1,2,3-cd)PYRENE | 0.65 | J | | J | | UJ | 2.1 | J | | U | | U | | U | | U |
| PYRENE | | U | | J | | UJ | 2.1 | J | | U | | U | | U | | U |
| **Physical Characteristics (mg/L)** | | | | | | | | | | | | | | | | |
| TOTAL ORGANIC CARBON | 8.3 | = | 8.8 | = | 9.3 | = | 8.4 | = | 8.1 | = | 9.9 | = | 8.7 | = | 10 | = |
| HARDNESS (as CACO3) | 310 | = | 1500 | = | 2000 | = | 300 | = | 1300 | = | 2300 | = | 760 | = | [illegible] | = |
| SUSPENDED SOLIDS (RESIDUE, NON-FILTERABLE) | | U | | J | | U | | U | 10 | = | 24 | = | | U | 26 | = |
| ALKALINITY, TOTAL (AS CACO3) | 190 | = | 130 | = | 110 | = | 180 | = | 150 | = | 100 | = | 170 | = | 95 | = |

| Parameter Name | Total Samples | Total Detections | Minimum Detected | Average Detected | Maximum Detected | Approved Screening Value | Total Detections > Screening Value | ADC Screening HQ Based on Maximum | Selected as PCOPC? | Approved Refinement Value (1) | Total Detections > Refinement Value | ADC Refinement HQ Based on Maximum | Selected as COPC? | Rationale for selection as COPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | All Samples | | | Screening for PCOPC Selection | | | | Refinement for Direct Exposure COPC Selection | | | | |
| **Inorganics (mg/L)** | | | | | | | | | | | | | | |
| BARIUM | 8 | 8 | 0.0440 | 0.0590 | 0.0850 | 5 | 0 | 0.01 | No | | | | | |
| CADMIUM | 8 | 1 | 0.0048 | 0.0048 | 0.0048 | 0.00066 | 1 | 7.27 | Yes | 0.00015 | 1 | 32.00 | No | Not detected in dissolved samples, attenuated due to low bioavailability |
| Cadmium, Dissolved | 8 | 0 | 0.0000 | 0.0000 | 0.0000 | - | - | - | Yes | - | - | - | | |
| CALCIUM | 8 | 8 | 73.0000 | 119.5000 | 160.0000 | | | | Yes | 116 | 5 | 1.38 | No | Essential nutrient |
| Calcium, Dissolved | 8 | 8 | 76.0000 | 122.1250 | 180.0000 | - | | | Yes | - | - | - | No | Essential nutrient |
| COPPER | 8 | 1 | 0.0030 | 0.0030 | 0.0030 | 0.000654 | 1 | 4.59 | Yes | 0.00071 | 1 | 13.84 | No | Not detected in dissolved samples, attenuated due to low bioavailability |
| Copper, Dissolved | 8 | 0 | 0.0000 | 0.0000 | 0.0000 | - | - | - | Yes | - | - | - | | |
| IRON | 8 | 8 | 0.3300 | 0.3725 | 0.4700 | 1 | 0 | 0.47 | No | | | | | |
| MAGNESIUM | 8 | 8 | 28.0000 | 247.1250 | 450.0000 | - | | - | Yes | 87 | 6 | [illegible] | No | Essential nutrient |
| Magnesium, Dissolved | 8 | 8 | 34.0000 | 265.0000 | 470.0000 | | | - | Yes | - | - | - | No | Essential nutrient |
| MANGANESE | 8 | 8 | 0.0460 | 0.0695 | 0.0900 | | | - | Yes | 1.1 | 0 | 0.07 | No | HQ were below 1 |
| POTASSIUM | 8 | 8 | 8.4000 | 89.0125 | 180.0000 | - | | - | Yes | 53 | 5 | 3.40 | No | Essential nutrient |
| Potassium, Dissolved | 8 | 8 | 10.0000 | 94.5000 | 170.0000 | | | - | Yes | - | - | - | No | Essential nutrient |
| SODIUM | 8 | 8 | 130.0000 | 1821.7500 | 3400.0000 | - | | - | Yes | 680 | 6 | 5.00 | No | Essential nutrient |
| Sodium, Dissolved | 8 | 8 | 170.0000 | 1970.0000 | 3500.0000 | - | - | - | Yes | - | - | - | No | Essential nutrient |
| VANADIUM | 8 | 1 | 0.0055 | 0.0055 | 0.0055 | 0.019 | 0 | 0.29 | No | | | | | |
| ZINC | 8 | 7 | 0.0080 | 0.0105 | 0.0180 | 0.05891 | 0 | 0.31 | No | | | | | |
| CYANIDE | 8 | 4 | 0.0058 | 0.0075 | 0.0094 | 0.0052 | 4 | 1.80 | Yes | 0.0078 | 1 | 1.21 | No | Low magnitude of exceedance |
| **Volatile Organic Compounds (ug/L)** | | | | | | | | | | | | | | |
| 1,2,4-TRICHLOROBENZENE | 1 | 1 | 3.60 | 3.60 | 3.60 | 44.9 | 0 | 0.08 | No | | | | | |
| **Semivolatile Organic Compounds (ug/L)** | | | | | | | | | | | | | | |
| BENZO(a)ANTHRACENE | 8 | 2 | 0.63 | 1.32 | 2.00 | 0.839 | 1 | 2.38 | Yes | 0.08 | 1 | 2.88 | No | Only detected at FSSW004, localized exposure |
| BENZO(a)PYRENE | 8 | 1 | 2.70 | 2.70 | 2.70 | 0.014 | 1 | 157.14 | Yes | 0.1 | 1 | 7.33 | No | Only detected at FSSW004, localized exposure |
| BENZO(b)FLUORANTHENE | 8 | 1 | 2.20 | 2.70 | 2.70 | 9.07 | 0 | 0.24 | No | | | | | |
| BENZO(g,h,i)PERYLENE | 8 | 2 | 0.70 | 1.40 | 2.10 | 7.64 | 0 | 0.27 | No | | | | | |
| BENZO(k)FLUORANTHENE | 8 | 1 | 1.70 | 1.70 | 1.70 | 0.0056 | 1 | 303.57 | Yes | - | - | - | No | Only detected at FSSW004, localized exposure |
| BENZYL BUTYL PHTHALATE | 8 | 1 | 2.00 | 2.00 | 2.00 | 22 | 0 | 0.09 | No | | | | | |
| bis(2-ETHYLHEXYL) PHTHALATE | 8 | 1 | 10.00 | 10.00 | 10.00 | 0.3 | 1 | 33.33 | Yes | 917 | 0 | 0.01 | No | HQ was below 1 |
| CARBAZOLE | 8 | 1 | 2.00 | 2.00 | 2.00 | - | - | - | Yes | - | - | - | No | Only detected at FSSW004, localized exposure |
| CHRYSENE | 8 | 2 | 0.53 | 1.37 | 2.20 | 0.011 | 2 | 66.67 | Yes | - | - | - | No | Only detected at FSSW004, localized exposure |
| DIBENZ(a,h)ANTHRACENE | 8 | 1 | 1.10 | 1.10 | 1.10 | 0.0018 | 1 | 611.50 | Yes | - | - | - | No | Only detected at FSSW004, localized exposure |
| Di-n-BUTYL PHTHALATE | 8 | 1 | 1.00 | 1.00 | 1.00 | 9.4 | 0 | 0.11 | No | | | | | |
| Di-n-OCTYL PHTHALATE | 8 | 1 | 1.50 | 1.50 | 1.50 | 30 | 0 | 0.05 | No | | | | | |
| FLUORANTHENE | 8 | 1 | 2.00 | 2.00 | 2.00 | 39.8 | 0 | 0.05 | No | | | | | |
| INDENO(1,2,3-cd)PYRENE | 8 | 2 | 0.65 | 1.38 | 2.10 | 4.31 | 0 | 0.49 | No | | | | | |
| PYRENE | 8 | 1 | 2.10 | 2.10 | 2.10 | 0.3 | 1 | 7.00 | Yes | 11000 | 0 | 0.00019 | No | HQ was below 1 |
| **Physical Characteristics (mg/L)** | | | | | | | | | | | | | | |
| TOTAL ORGANIC CARBON | 8 | 8 | 6.30 | 8.35 | 10.00 | | | | No | | | | | |
| HARDNESS (as CACO3) | 8 | 8 | 300.00 | 1311.25 | 2300.00 | | | | No | | | | | |
| SUSPENDED SOLIDS (RESIDUE, NON-FILTERABLE) | 8 | 3 | 10.00 | 20.00 | 26.00 | | | | No | | | | | |
| ALKALINITY, TOTAL (AS CACO3) | 8 | 8 | [illegible] | 140.61 | 190.00 | | | | No | | | | | |

Notes:
(1) [illegible]
= Unqualified
U Undetected
J Estimated value
R [illegible]
[illegible]
[illegible]

ROD Table 4

and TCL parameters. The intended background sampling location is located within the ash/lead delineation area and was therefore converted to a downstream sample location. No additional surface water/sediment locations could be found upstream of the site, therefore, there is no background location available for this site.

Twelve metals were detected in surface water: aluminum, arsenic, barium, chromium, copper, cyanide, iron, lead, manganese, mercury, vanadium and zinc. Of these, aluminum, copper, cyanide, lead, iron, mercury and zinc exceeded their respective screening criteria from the Region 4 Ecological Risk Assessment Bulletins. Dissolved metals were also determined and, in most cases, were below criteria indicating the metals are associated with turbidity and suspended solids in the samples. The three samples having the greatest number of exceedances for the total metals results are located in the ditch along the west side of the site. This ditch does not usually contain water and is not a viable aquatic habitat.

Total iron exceeded its screening criterion in all but one of the surface water samples. It exceeds the iron criterion in only one of the dissolved metals samples. Iron is naturally elevated in the shallow groundwater in the area. As it discharges to surface water it would be expected to precipitate as it mixes with the oxygenated surface water, forming iron oxide. This would explain the presence of iron in the total metals sample.

Cyanide exceeds threshold criteria in four surface water samples ranging from 0.0066 mg/L to 0.0082 mg/L, slightly above the screening criterion of 0.0052 mg/L. Cyanide is not believed to be related to the site because it was not detected in any of the 7 monitoring wells.

Thirteen of the fourteen sampling stations were drainage ditches that had little or no flowing water, and were not typical of an aquatic habitat. One sample station is located at the point where the main drainage ditch for the site discharges to Hogan's Creek, which is located approximately one-half mile from the site. Hogan's Creek has flowing water and is more typical of an aquatic habitat, although not a very important habitat. Only one TAL parameter was found above screening criteria. Cyanide was detected at an estimated concentration of 0.0066 mg/L, slightly above the screening criterion of 0.0052 mg/L. The low cyanide concentration found in Hogan's Creek is believed to be natural and not site related.

Table 5 lists the constituents detected by surface water analysis.

### 3.6.3 Lonnie C. Miller, Sr. Park

Surface drainage generally flows to a drainage ditch that is located on the eastern portion of the site. This ditch is the topographic divide between the western and eastern portions of the site. The ditch conveys water to the northeast to a small tributary of the Ribault River. The tributary flows south and discharges into the Ribault River approximately 0.25 mile downstream of the site.

During RI sampling events in 2000, a total of 21 surface water samples and eight background surface water samples were obtained. The background samples were analyzed for TAL and downstream site samples were analyzed for TAL and TCL.

All of the TAL metals except cyanide were detected in seven of the onsite ditch total surface water samples. The most frequent exceedances of the srceening criteria from the Region 4 Ecological Risk Assessment Bulletins were aluminum (6 of 7) and iron and lead (5 of 7 each). These 3 metals and zinc were the only exceedances of background concentrations in total TAL tests on surface water. Samples with the highest total suspended solids also had the highest metal concentrations. This is particularly true of iron. Total iron ranged up to 160 mg/L. Dissolved iron in the ditch water exceeded criteria but was considerably lower in concentration compared to total iron, ranging up to 8.3 mg/L. Aluminum, lead, and zinc did not exceed screening criteria in dissolved metal samples.

The northern section of the drainage ditch flowing to the unnamed tributary of the Ribault River only marginally exceeded screening criteria for aluminum and iron. The unnamed tributary of the Ribault River is represented by three surface water sample locations. Proceeding from upstream to downstream in the unnamed tributary of the Ribault River, exceedances above background included aluminum and iron in one sample, cyanide only in the second location, and none in the third. The cyanide was not elevated in the ditch and may be associated with backwater from the Ribault River because it is higher in concentration in more saline water. Sodium increases from about 10 mg/L in the ditch to 2,900 mg/L in the unnamed tributary.

The Ribault River surface water sample results showed aluminum (7 of 10), cyanide (1 of 10), iron (2 of 10), and lead (5 of 10) exceeding screening criteria, and aluminum (4 of 10), cyanide (1 of 10), and lead (4 of 10) exceeding both screening criteria and background values. However, lead and cyanide were also detected above screening criteria in at least one background surface water sample.

Table 6 lists the constituents detected by surface water analysis.

## 3.7 Groundwater Contamination

### 3.7.1 Forest Street Incinerator

The Forest Street Incinerator site is located south of McCoy Creek, with groundwater beneath the site flowing toward the creek in a northeasterly direction. The groundwater table in the area is typically encountered between approximately 4 to 12 feet below ground surface (bgs). McCoy Creek acts as the discharge zone for groundwater from the Forest Street Incinerator Site. The average horizontal hydraulic gradient, which is defined as the slope of the water table across the site, was calculated at 0.01.

During the RI, two groundwater sampling events were performed. One event occurred in 2000 and the second event occurred in 2002. Twenty-two wells were sampled in 2000. No residential wells or community wells near the site were sampled. Table 7 lists all of the constituents detected above respective health based screening levels during the 2000 Phase I RI groundwater sampling.

Table 2-8
Surface Water Sample Results and Selection of PCOPEC and COPEC
Jacksonville Ash Superfund Site
5th and Cleveland
Page 1 of 1

| Parameter Name | Samples from Areas of Expected Contamination: FCSW001 Result | Q | FCSW002 Result | Q | FCSW003 Result | Q | FCSW004 Result | Q | FCSW005 Result | Q | FCSW008 Result | Q | FCSW010 Result | Q | FCSW011 Result | Q | FCSW012 Result | Q | FCSW013 Result | Q | AOC Samples: Total Samples | Total Detections | Minimum Detected | Average Detected | Maximum Detected | Screening for PCOPC Selection: Approved Screening Value | Total Detections > Screening Value | AOC Screening HQ Based on Maximum | Selected as PCOPC? | Refinement for Direct Exposure COPC Selection: Approved Refinement Value | Total Detections > Refinement Value | AOC Refinement HQ Based on Maximum | Selected as COPC? | Rationale for selection as COPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Inorganics (mg/L) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALUMINUM | 1.3 | * | 2.6 | * | 0.23 | * | | U | | U | | U | | U | | UJ | | UJ | | U | 10 | 3 | 0.2300 | 1.3767 | 2.6000 | 0.087 | 2 | 29.89 | Yes | 0.46 | 2 | 5.65 | No | Not in dissolved sample; low bioavailability |
| ARSENIC | 0.0045 | J | | U | | U | | U | | U | | U | | U | | U | | U | | U | 10 | 1 | 0.0045 | 0.0045 | 0.0045 | 0.19 | 0 | 0.02 | No | | | | | |
| Arsenic Dissolved | 0.0041 | J | | U | | U | | U | | U | | U | | U | | U | | U | | U | 10 | 1 | 0.0041 | 0.0041 | 0.0041 | 0.19 | 0 | 0.02 | No | | | | | |
| BARIUM | 0.15 | J | 0.18 | J | 0.17 | J | 0.081 | J | 0.1 | J | 0.1 | J | 0.1 | J | [illegible] | J | 0.091 | J | 0.055 | J | 10 | 10 | 0.0550 | 0.1132 | 0.1800 | 5 | 0 | 0.04 | No | | | | | |
| Barium Dissolved | 0.11 | J | 0.15 | J | 0.15 | J | 0.086 | J | 0.089 | J | 0.099 | J | 0.1 | J | 0.081 | J | 0.088 | J | 0.064 | J | 10 | 10 | 0.0640 | 0.1057 | 0.1500 | 5 | 0 | 0.03 | No | | | | | |
| CALCIUM | 120 | * | 150 | * | 140 | * | 71 | * | 73 | * | 74 | * | 20 | * | 77 | * | 69 | * | 57 | * | 10 | 10 | 20.0000 | 84.5000 | 150.0000 | - | - | - | Yes | 116 | 3 | 1.29 | No | Essential nutrient |
| Calcium Dissolved | 110 | * | 130 | * | 130 | * | 68 | * | 74 | * | 75 | * | 20 | * | 77 | * | 69 | * | 64 | * | 10 | 10 | 20.0000 | 81.7000 | 130.0000 | | - | - | Yes | 116 | 2 | 1.12 | No | Essential nutrient |
| CHROMIUM TOTAL | 0.005 | J | 0.0069 | J | 0.0018 | J | | U | | U | | U | 0.0018 | J | | U | | U | | U | 10 | 4 | 0.0018 | 0.0039 | 0.0069 | 0.011 | 0 | 0.63 | No | | | | | |
| COPPER | 0.011 | J | 0.014 | J | | U | 0.0031 | J | | U | | U | | U | | U | | U | | U | 10 | 3 | 0.0021 | 0.0090 | 0.0140 | 0.000654 | 3 | 21.41 | Yes | 0.00023 | 3 | 60.87 | No | Low bioavailability & toxicity |
| Copper Dissolved | 0.0022 | J | | U | | U | 0.00093 | J | | U | | U | | U | | U | | U | 0.01 | J | 10 | 3 | 0.0009 | 0.0044 | 0.0100 | 0.000654 | 3 | 15.29 | Yes | 1.13 | 0 | 0.0088 | No | HQ was below 1 |
| IRON | 2.1 | * | 6.6 | * | 13 | * | 3.2 | * | 2.4 | * | 1.7 | * | 8.1 | * | 1.6 | * | 1.7 | * | | U | 10 | 9 | 1.6000 | 4.1333 | 13.0000 | 1 | 9 | 13.00 | Yes | 0.158 | 9 | 82.28 | Yes | HQ greater than 1 |
| Iron Dissolved | | U | | U | 1 | * | 0.37 | * | 0.084 | J | 0.046 | J | 5.5 | * | 0.23 | * | 0.11 | * | 0.52 | * | 10 | 8 | 0.0460 | 0.9725 | 5.5000 | 1 | 1 | 5.50 | Yes | 0.158 | 5 | 34.81 | Yes | HQ greater than 1 |
| LEAD | 0.027 | * | 0.053 | * | | U | | U | | U | | U | 0.014 | * | | U | | U | | U | 10 | 3 | 0.0140 | 0.0313 | 0.0530 | 0.00132 | 3 | 40.15 | Yes | 0.01128 | 3 | 4.81 | No | Low bioavailability & toxicity |
| Lead Dissolved | | U | | U | | U | | U | | U | 0.0018 | J | 0.0061 | * | | U | | U | | U | 10 | 2 | 0.0018 | 0.0040 | 0.0061 | 0.00132 | 2 | 4.62 | Yes | 0.185 | 0 | 0.04 | No | HQ was below 1 |
| MAGNESIUM | 15 | * | 18 | * | 19 | * | 14 | * | 15 | * | 15 | * | 7 | * | 14 | * | 13 | * | 10 | * | 10 | 10 | 7.0000 | 14.1000 | 19.0000 | - | - | - | Yes | 82 | 0 | 0.23 | No | Essential nutrient |
| Magnesium Dissolved | 15 | * | 18 | * | 19 | * | 14 | * | 15 | * | 15 | * | 7 | * | 14 | * | 13 | * | 12 | * | 10 | 10 | 7.0000 | 14.2000 | 19.0000 | - | - | - | Yes | 82 | 0 | 0.23 | No | Essential nutrient |
| MANGANESE | 0.14 | * | 0.22 | * | 0.25 | * | 0.058 | * | 0.061 | * | 0.051 | * | 0.011 | * | 0.056 | * | 0.073 | * | 0.04 | * | 10 | 10 | 0.0110 | 0.0968 | 0.2500 | | - | | Yes | 1.1 | 0 | 0.23 | No | HQ was below 1 |
| Manganese Dissolved | 0.052 | * | | U | 0.22 | * | 0.056 | * | 0.047 | * | 0.05 | * | 0.024 | * | 0.054 | * | 0.053 | * | 0.046 | * | 10 | 9 | 0.0240 | 0.0680 | 0.2200 | - | - | - | Yes | 1.1 | 0 | 0.20 | No | HQ was below 1 |
| POTASSIUM | 8.7 | * | 13 | * | 15 | * | 4.5 | J | 4.3 | J | 4.8 | J | 1.6 | J | 5 | J | 4.6 | J | 3.6 | J | 10 | 10 | 1.6000 | 6.5100 | 15.0000 | - | - | - | Yes | 53 | 0 | 0.28 | No | Essential nutrient |
| Potassium Dissolved | 8.2 | * | 11 | * | 14 | * | 4.5 | J | 4.3 | J | 4.7 | J | 1.6 | J | 5 | * | 4.7 | J | 3.8 | J | 10 | 10 | 1.6000 | 6.1800 | 14.0000 | - | - | - | Yes | 53 | 0 | 0.26 | No | Essential nutrient |
| SODIUM | 47 | * | 70 | * | 75 | * | 37 | * | 40 | * | 43 | * | 53 | * | 44 | * | 44 | * | 37 | * | 10 | 10 | 37.0000 | 48.5000 | 75.0000 | - | - | - | Yes | 680 | 0 | 0.11 | No | Essential nutrient |
| Sodium Dissolved | 29 | * | 84 | * | 75 | * | 28 | * | 40 | * | 44 | * | 55 | * | 44 | * | 42 | * | 36 | * | 10 | 10 | 28.0000 | 46.0000 | 75.0000 | - | - | - | Yes | 680 | 0 | 0.11 | No | Essential nutrient |
| VANADIUM | 0.0056 | J | 0.01 | J | 0.0027 | J | | U | | U | | U | | U | | U | | U | | U | 10 | 3 | 0.0027 | 0.0061 | 0.0100 | 0.019 | 0 | 0.53 | No | | | | | |
| ZINC | 0.061 | * | 0.086 | * | 0.025 | * | | U | | U | | U | 0.038 | * | | U | 0.007 | J | 0.0097 | J | 10 | 6 | 0.0070 | 0.0405 | 0.0860 | 0.05891 | 2 | 1.63 | Yes | 0.033841 | 3 | 2.85 | No | Low bioavailability & toxicity |
| Zinc Dissolved | 0.012 | J | | U | | U | | U | | U | | U | 0.019 | J | | U | | U | 0.014 | J | 10 | 3 | 0.0120 | 0.0150 | 0.0190 | 0.05891 | 0 | 0.32 | No | | | | | |
| MERCURY | | U | | U | | U | | U | 0.0001 | J | 0.00011 | J | 0.000078 | J | | U | | U | | U | 10 | 3 | 0.0001 | 0.0001 | 0.0001 | 0.000012 | 3 | 9.17 | Yes | 0.00004 | 3 | 2.75 | Yes | HQ greater than 1 |
| Mercury Dissolved | | U | | U | | U | | U | | U | 0.00012 | J | | U | | U | | U | | U | 10 | 1 | 0.0001 | 0.0001 | 0.0001 | 0.000012 | 1 | 10.00 | Yes | 0.00004 | 1 | 3.00 | Yes | HQ greater than 1 |
| CYANIDE | | U | | U | | U | 0.0082 | J | | U | | U | | U | 0.008 | J | 0.0076 | J | 0.0066 | J | 10 | 4 | 0.0066 | 0.0076 | 0.0082 | 0.0052 | 4 | 1.58 | Yes | 0.0078 | 2 | 1.05 | No | Low magnitude of exceedance |
| Pesticides (ug/L) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GAMMA BHC (LINDANE) | | UJ | | R | | U | | UJ | | UJ | | UJ | | R | | U | | U | 0.0069 | J | 10 | 1 | 0.0069 | 0.0069 | 0.0069 | 0.08 | 0 | 0.09 | No | | | | | |
| Volatile Organic Compounds (ug/L) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CHLOROFORM | | | | U | | | | | 1.8 | J | | | | | | | | U | | | 3 | 1 | 1.8000 | 1.8000 | 1.8000 | 289 | 0 | 0.01 | No | | | | | |
| TRICHLOROETHYLENE (TCE) | | | | U | | | | | 0.71 | J | | | | | | | | U | | | 3 | 1 | 0.7100 | 0.7100 | 0.7100 | 75 | 0 | 0.01 | No | | | | | |
| Semivolatile Organic Compounds (ug/L) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BENZO(a)ANTHRACENE | | U | | U | | U | | U | | U | 0.53 | J | 0.46 | J | | U | | U | | U | 10 | 2 | 0.4600 | 0.4950 | 0.5300 | 0.839 | 0 | 0.63 | No | | | | | |
| BENZO(g,h,i)PERYLENE | | U | | U | | U | | U | | UJ | 0.75 | J | | UJ | | U | | U | | U | 10 | 1 | 0.7500 | 0.7500 | 0.7500 | 7.64 | 0 | 0.10 | No | | | | | |
| BENZYL BUTYL PHTHALATE | | U | | U | | U | | U | 0.47 | J | 0.61 | J | 0.51 | J | | U | | U | | U | 10 | 3 | 0.4700 | 0.5300 | 0.6100 | 22 | 0 | 0.03 | No | | | | | |
| CARBAZOLE | | U | | U | | U | | U | | U | 0.67 | J | | U | | U | | U | | U | 10 | 1 | 0.6700 | 0.6700 | 0.6700 | - | - | - | Yes | - | - | - | Yes | No refinement value |
| CHRYSENE | | U | | U | | U | | U | | U | 0.52 | J | | U | | U | | U | | U | 10 | 1 | 0.5200 | 0.5200 | 0.5200 | 0.033 | 1 | 15.76 | Yes | - | - | - | Yes | No refinement value |
| DIETHYL PHTHALATE | | U | | U | | U | | U | | U | | U | | U | 1.1 | J | | U | | U | 10 | 1 | 1.1000 | 1.1000 | 1.1000 | 521 | 0 | 0.00 | No | | | | | |
| Di-n-BUTYL PHTHALATE | | U | | U | | U | | U | 2.6 | J | 0.55 | J | | U | | U | | U | | U | 10 | 2 | 0.5500 | 1.5750 | 2.6000 | 9.4 | 0 | 0.28 | No | | | | | |
| Di-n-OCTYLPHTHALATE | | U | | U | | U | | U | | U | 0.54 | J | | U | | U | | U | | U | 10 | 1 | 0.5400 | 0.5400 | 0.5400 | 30 | 0 | 0.02 | No | | | | | |
| FLUORANTHENE | | U | | U | | U | | U | | U | 0.71 | J | 0.35 | J | | U | | U | | U | 10 | 2 | 0.3500 | 0.5300 | 0.7100 | 39.8 | 0 | 0.02 | No | | | | | |
| INDENO(1,2,3-cd)PYRENE | | U | | U | | U | | U | | U | 0.64 | J | | U | | U | | U | | U | 10 | 1 | 0.6400 | 0.6400 | 0.6400 | 4.31 | 0 | 0.15 | No | | | | | |
| PYRENE | | U | | U | | U | | U | | U | 0.67 | J | | U | | U | | U | | U | 10 | 1 | 0.6700 | 0.6700 | 0.6700 | 0.3 | 1 | 2.23 | Yes | 11000 | 0 | 0.00006 | No | HQ was below 1 |
| Physical Characteristics (mg/L) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TOTAL ORGANIC CARBON | 19 | * | 18 | * | 18 | * | 7.9 | * | 4.6 | * | 4.5 | * | 4.1 | * | 6.7 | * | 7.4 | * | 5.8 | * | 10 | 10 | 4.1000 | 11.4100 | 43.0000 | | - | | | | | | | |
| HARDNESS (as CACO3) | 350 | * | 450 | * | 420 | * | 240 | * | 240 | * | 250 | * | 78 | * | 240 | * | 220 | * | 180 | * | 10 | 10 | 78.0000 | 266.8000 | 450.0000 | - | - | | | | | | | |
| SUSPENDED SOLIDS (RESIDUE, NON-FILTERABLE) | 26 | * | 33 | * | 56 | * | 5 | * | | U | 5.5 | * | | U | 16 | * | 16 | * | | U | 10 | 7 | 5.0000 | 22.5000 | 56.0000 | - | - | - | | | | | | |
| ALKALINITY, TOTAL (AS CACO3) | 210 | * | 250 | * | 250 | * | 130 | * | 130 | * | 140 | * | 83 | * | 150 | * | 160 | * | 150 | * | 10 | 10 | 83.0000 | 165.3000 | 250.0000 | - | - | | | | | | | |

ROD Table 5

Table 2-6
Surface Water Sample Results and Selection of PCOPEC and COPEC
Jacksonville Ash Superfund Site
Lonnie C. Miller, Jr. Park
Page 1 of 2

Samples from Areas of Expected Contamination (April 2000 Sampling)

| ParameterName | LMSW002 Result | Q | LMSW003 Result | Q | LMSW007 Result | Q | LMSW009 Result | Q | LMSW010 Result | Q | LMSW011 Result | Q | LMSW012 Result | Q | LMSW013 Result | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganics (mg/L)** | | | | | | | | | | | | | | | | |
| ALUMINUM | 0.74 | = | 1.4 | J | 0.28 | = | 0.62 | J | 5.1 | = | | U | 4.7 | = | 0.35 | = |
| Aluminum Dissolved | | U | | U | | U | | U | | U | | U | 0.049 | J | | U |
| ARSENIC | | U | | U | | U | | U | 0.03 | = | | U | 0.0088 | J | | U |
| Arsenic Dissolved | | U | | U | | U | | U | | U | | U | | U | | U |
| BARIUM | 0.024 | J | 0.061 | J | 0.32 | = | 0.48 | = | 1.1 | = | 0.35 | = | 0.55 | = | 0.14 | J |
| Barium Dissolved | 0.02 | J | 0.055 | J | 0.28 | = | 0.35 | = | 0.23 | = | 0.32 | = | 0.41 | = | 0.13 | J |
| CADMIUM | | U | | U | | U | | U | 0.0046 | J | | U | 0.0032 | J | | U |
| Cadmium Dissolved | | U | | U | | U | | U | | U | | U | | U | | U |
| CALCIUM | 68 | = | 71 | = | 93 | = | 61 | = | 56 | = | 60 | = | 150 | = | 160 | = |
| Calcium Dissolved | 65 | = | 67 | = | 91 | = | 49 | = | 40 | = | 60 | = | 140 | = | 160 | = |
| CHROMIUM, TOTAL | | U | | U | | U | | U | 0.045 | = | | U | 0.014 | = | | U |
| Chromium, Dissolved | | U | | U | | U | | U | | U | | U | | U | | U |
| COBALT | | U | | U | | U | | U | 0.0019 | J | | U | | U | | U |
| COPPER | | U | | U | | U | 0.033 | = | 0.29 | = | | U | 0.081 | = | 0.0026 | J |
| Copper Dissolved | | U | | U | | U | | U | | U | | U | 0.002 | J | 0.002 | J |
| IRON | 0.58 | = | 0.85 | = | 6 | = | 27 | = | 160 | = | 5.6 | = | 55 | = | 1.1 | = |
| Iron Dissolved | | U | | U | | U | 8 | = | 3 | = | 2.9 | = | 4.3 | = | 0.091 | J |
| LEAD | | U | | U | 0.0074 | = | 0.036 | = | 0.3 | = | 0.0018 | J | 0.083 | = | | U |
| Lead Dissolved | | U | | U | | U | | U | | U | | U | | U | | U |
| MAGNESIUM | 25 | = | 24 | = | 18 | = | 13 | = | 9 | = | 11 | = | 250 | = | 340 | = |
| Magnesium Dissolved | 25 | = | 23 | = | 18 | = | 12 | = | 7.5 | = | 13 | = | 200 | = | 350 | = |
| MANGANESE | | U | | U | 0.16 | = | 0.23 | = | 0.43 | = | 0.31 | = | 0.67 | = | 0.3 | = |
| Manganese Dissolved | | U | | U | 0.11 | = | 0.18 | = | 0.15 | = | 0.32 | = | 0.57 | = | 0.26 | = |
| NICKEL | | U | | U | | U | | U | 0.027 | J | | U | 0.01 | J | | U |
| Nickel Dissolved | | U | | U | | U | | U | | U | 0.0051 | J | | U | | U |
| POTASSIUM | 1.6 | J | 2.4 | J | 7.9 | = | 2.5 | J | 2.5 | J | 5.5 | = | 88 | = | 130 | = |
| Potassium Dissolved | 1.5 | J | 2.2 | J | 7.7 | = | 2.3 | J | 2.6 | J | 6.6 | = | 76 | = | 130 | = |
| SILVER | | U | | U | | U | | U | 0.0032 | J | | U | | U | | U |
| SODIUM | 11 | = | 13 | = | 28 | = | 13 | = | 11 | = | 67 | = | 1900 | = | 2700 | = |
| Sodium Dissolved | 12 | = | 13 | = | 27 | = | 12 | = | 10 | = | 58 | = | 1500 | = | 2900 | = |
| VANADIUM | | U | 0.0054 | J | | U | 0.0033 | J | 0.024 | J | | U | 0.015 | J | 0.0039 | J |
| Vanadium Dissolved | | U | 0.0044 | J | | U | | U | | U | | U | | U | 0.0034 | J |
| ZINC | 0.017 | J | | U | | U | 0.12 | = | 0.78 | = | 0.0065 | J | 0.26 | = | 0.0085 | J |
| Zinc Dissolved | | U | | U | | U | | U | | U | | U | 0.012 | J | | U |
| MERCURY | | U | | U | | U | | U | 0.00044 | = | | U | 0.00023 | = | | U |
| Mercury Dissolved | | U | | U | | U | | U | | U | | U | | U | | U |
| CYANIDE | | U | | U | | U | | U | | U | | U | | U | | U |
| **Volatile Organic Compounds (ug/L)** | | | | | | | | | | | | | | | | |
| METHYLENE CHLORIDE | | | | U | | | 2.5 | J | | | | | | | | U |
| **Semivolatile Organic Compounds (ug/L)** | | | | | | | | | | | | | | | | |
| BENZO(a)ANTHRACENE | | U | | U | 0.97 | J | 0.78 | J | | U | | U | | U | | U |
| BENZO(a)PYRENE | | U | | U | 0.95 | J | 0.84 | J | | U | | U | | U | | U |
| BENZO(b)FLUORANTHENE | | U | | U | 1.3 | J | | U | | U | | U | | U | | U |
| BENZO(g,h,i)PERYLENE | | U | | U | | U | | U | | U | | U | | U | | U |
| BENZO(k)FLUORANTHENE | | U | | U | 1.3 | J | | U | | U | | U | | U | | U |
| BENZYL BUTYL PHTHALATE | | U | | U | 0.69 | J | | U | | U | | U | | U | | U |
| bis(2-ETHYLHEXYL)PHTHALATE | | U | | U | | U | | U | | U | | U | | U | | U |
| CHRYSENE | | U | | U | 1.1 | J | 0.74 | J | | U | | U | | U | | U |
| DIBENZ(a,h)ANTHRACENE | | U | | U | | U | | U | | U | | U | | U | | U |
| Di-n-BUTYL PHTHALATE | | U | | U | | U | 0.36 | J | | U | | U | | U | | U |
| Di-n-OCTYL PHTHALATE | | U | | U | 1.8 | J | 1.6 | J | | U | | U | | U | | U |
| FLUORANTHENE | | U | | U | | U | | U | | U | | U | | U | | U |
| INDENO(1,2,3-cd)PYRENE | | U | | U | | U | | U | | U | | U | | U | | U |
| PYRENE | | U | | U | | U | | U | | U | | U | | U | | U |

| ParameterName | LMSW014 Result | Q | LMSW015 Result | Q | LMSW016 Result | Q | LMSW017 Result | Q | LMSW018 Result | Q | LMSW019 Result | Q | LMSW020 Result | Q | LMSW021 Result | Q | LMSW022 Result | Q | LMSW023 Result | Q | LMSW024 Result | Q | LMSW025 Result | Q | LMSW026 Result | Q | Total Samples |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganics (mg/L)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ALUMINUM | 0.8 | = | | U | | U | 0.62 | = | 0.41 | = | 1 | = | 0.82 | = | 0.83 | = | | U | | U | 1.3 | = | | U | 1.1 | = | 21 |
| Aluminum Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| ARSENIC | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.0046 | J | 21 |
| Arsenic Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.0052 | J | 21 |
| BARIUM | 0.29 | = | 0.075 | = | 0.063 | J | 0.069 | J | 0.067 | J | 0.075 | J | 0.055 | J | 0.062 | J | 0.045 | J | 0.051 | J | 0.055 | J | 0.049 | J | 0.051 | J | 21 |
| Barium Dissolved | 0.26 | = | 0.07 | J | 0.063 | J | 0.069 | J | 0.065 | J | 0.058 | J | 0.051 | J | 0.055 | J | 0.045 | J | 0.05 | J | 0.049 | J | 0.044 | J | 0.051 | J | 21 |
| CADMIUM | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| Cadmium Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | 0.0027 | J | | U | | U | | U | | U | 21 |
| CALCIUM | 170 | = | 94 | = | 100 | = | 110 | = | 99 | = | 120 | = | 96 | = | 100 | = | 66 | = | 78 | = | 79 | = | 70 | = | 120 | = | 21 |
| Calcium Dissolved | 170 | = | 95 | = | 100 | = | 120 | = | 100 | = | 110 | = | 91 | = | 91 | = | 70 | = | 79 | = | 76 | = | 88 | = | 130 | = | 21 |
| CHROMIUM, TOTAL | | U | | U | | U | | U | | U | 0.0018 | J | | U | | U | | U | | U | | U | | U | 0.002 | J | 21 |
| Chromium, Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| COBALT | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| COPPER | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.0037 | J | | U | | U | | U | 21 |
| Copper Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.0025 | J | | U | | U | | U | 21 |
| IRON | 2.7 | = | 0.52 | = | 0.35 | = | 0.77 | = | 0.64 | = | 1.1 | = | 0.75 | = | 0.94 | = | 0.41 | = | 0.57 | = | 1.5 | = | 0.56 | = | 0.94 | = | 21 |
| Iron Dissolved | 0.165 | J | | U | | U | | U | 0.056 | J | 0.18 | = | | U | | U | | U | 0.029 | J | | U | | U | 0.031 | J | 21 |
| LEAD | | U | | U | | U | 0.0015 | J | | U | | U | | U | 0.003 | J | | U | | U | 0.0031 | = | 0.0027 | J | 0.0034 | = | 21 |
| Lead Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| MAGNESIUM | 200 | = | 180 | = | 220 | = | 240 | = | 200 | = | 260 | = | 190 | = | 210 | = | 91 | = | 120 | = | 130 | = | 94 | = | 290 | = | 21 |
| Magnesium Dissolved | 200 | = | 190 | = | 210 | = | 250 | = | 210 | = | 240 | = | 180 | = | 170 | = | 100 | = | 140 | = | 130 | = | 90 | = | 320 | = | 21 |
| MANGANESE | 0.47 | = | 0.13 | = | 0.11 | = | 0.15 | = | 0.14 | = | 0.16 | = | 0.1 | = | 0.13 | = | 0.078 | = | 0.099 | = | 0.11 | = | 0.084 | = | 0.05 | = | 21 |
| Manganese Dissolved | 0.46 | = | 0.12 | = | 0.098 | = | 0.13 | = | 0.12 | = | 0.13 | = | 0.071 | = | 0.098 | = | 0.07 | = | 0.066 | = | 0.073 | = | 0.061 | = | 0.059 | = | 21 |
| NICKEL | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| Nickel Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| POTASSIUM | 110 | = | 58 | = | 74 | J | 78 | = | 63 | = | 87 | = | 65 | J | 67 | = | 28 | J | 41 | J | 45 | J | 39 | J | 110 | J | 21 |
| Potassium Dissolved | 120 | = | 62 | = | 74 | J | 86 | = | 73 | = | 78 | = | 62 | J | 55 | = | 34 | J | 47 | J | 44 | J | 37 | J | 120 | J | 21 |
| SILVER | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| SODIUM | 2100 | = | 1400 | = | 1600 | = | 1800 | = | 1200 | = | 1800 | = | 1300 | = | 1500 | = | 650 | = | 780 | = | 910 | = | 660 | = | 2100 | = | 21 |
| Sodium Dissolved | 2100 | = | 1400 | = | 1400 | = | 1800 | = | 1500 | = | 1600 | = | 1300 | = | 1200 | = | 690 | = | 1000 | = | 940 | = | 640 | = | 2300 | = | 21 |
| VANADIUM | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.0042 | J | | U | 21 |
| Vanadium Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.0031 | J | 0.007 | J | 21 |
| ZINC | | U | 0.025 | = | | U | 0.014 | J | | U | 0.025 | = | 0.011 | J | 0.018 | J | 0.0098 | J | 0.0096 | J | 0.021 | = | 0.010 | J | 0.012 | J | 21 |
| Zinc Dissolved | | U | | U | | U | 0.0066 | J | | U | | U | | U | 0.0072 | J | 0.024 | = | | U | | U | 0.0051 | J | | U | 21 |
| MERCURY | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| Mercury Dissolved | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| CYANIDE | 0.0157 | J | 0.015 | = | | U | | U | 0.01 | = | | U | | U | | U | | U | | U | | U | | U | | U | 21 |
| **Volatile Organic Compounds (ug/L)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| METHYLENE CHLORIDE | | | | U | | | | | | | | | | U | | | | U | | | | | | | | U | 7 |
| **Semivolatile Organic Compounds (ug/L)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| BENZO(a)ANTHRACENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 6.4 | J | | U | 21 |
| BENZO(a)PYRENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 3.8 | J | 0.51 | J | 21 |
| BENZO(b)FLUORANTHENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 4.7 | J | 0.66 | J | 21 |
| BENZO(g,h,i)PERYLENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.79 | J | 1.9 | J | | UJ | 21 |
| BENZO(k)FLUORANTHENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 5.1 | J | | U | 21 |
| BENZYL BUTYL PHTHALATE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 5 | J | | U | 21 |
| bis(2-ETHYLHEXYL)PHTHALATE | | U | 1.6 | J | | U | 0.83 | J | | U | | U | | U | 1.4 | J | | U | | U | | U | | U | | U | 21 |
| CHRYSENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 8.1 | J | | U | 21 |
| DIBENZ(a,h)ANTHRACENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 1.3 | J | | U | 21 |
| Di-n-BUTYL PHTHALATE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.93 | J | | U | 21 |
| Di-n-OCTYL PHTHALATE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 1.7 | J | 0.46 | J | 21 |
| FLUORANTHENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 0.76 | J | 13 | J | | U | 21 |
| INDENO(1,2,3-cd)PYRENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 1.7 | J | | U | 21 |
| PYRENE | | U | | U | | U | | U | | U | | U | | U | | U | | U | | U | 1.4 | J | 16 | J | | U | 21 |

ROD Table 6

Notes
= Unqualified
U Undetected
J Estimated value
* Data was rejected
Samples shown in yellow exceed screening value
Samples shown in orange exceed refinement value
Screened COPEC are blacked out

3/21/2003

Table 2-6
Surface Water Sample Results and Selection of PCOPEC and COPEC
Jacksonville Ash Superfund Site
Lonnie C. Miller, Jr. Park
Page 2 of 2

| ParameterName | AOC Samples | | | | Screening for PCOPEC Selection | | | | Refinement for Direct Exposure COPEC Selection | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total Detections | Minimum Detected | Average Detected | Maximum Detected | Approved Screening Value | Total Detections > Screening | AOC Screening HQ Based on Maximum | Selected as PCOPEC? | Approved Refinement Value | Total Detections > Refinement Value | AOC Refinement HQ Based on Maximum | Selected as COPC? | Rationale for selection as COPEC |
| **Inorganics (mg/L)** | | | | | | | | | | | | | |
| ALUMINUM | 15 | 0.28 | 1.325 | 5.1 | 0.087 | 15 | 58.62 | Yes | 0.46 | 12 | 11.09 | No | Bioavailable portion (dissolved) not a COPEC |
| Aluminum, Dissolved | 1 | 0.049 | 0.049 | 0.049 | 0.087 | 0 | 0.56 | No | [redacted] | | | | |
| ARSENIC | 3 | 0.0046 | 0.014 | 0.03 | 0.19 | 0 | 0.16 | No | | | | | |
| Arsenic, Dissolved | 1 | 0.0052 | 0.005 | 0.0052 | 0.19 | 0 | 0.03 | No | | | | | |
| BARIUM | 21 | 0.024 | 0.192 | 1.1 | 5 | 0 | 0.22 | No | | | | | |
| Barium, Dissolved | 21 | 0.02 | 0.131 | 0.41 | 5 | 0 | 0.08 | No | | | | | |
| CADMIUM | 2 | 0.0032 | 0.004 | 0.0048 | 0.00066 | 2 | 7.27 | Yes | 0.00788 | 2 | 0.61 | No | Bioavailable portion (dissolved) not a COPEC |
| Cadmium, Dissolved | 1 | 0.0027 | 0.003 | 0.0027 | 0.00066 | 1 | 4.09 | Yes | 0.00788 | 0 | 0.34 | | |
| CALCIUM | 21 | 56 | 96.143 | 170 | - | - | | Yes | - | - | | No | Essential nutrient |
| Calcium, Dissolved | 21 | 40 | 93.905 | 170 | - | - | | Yes | - | | | | |
| CHROMIUM, TOTAL | 4 | 0.0018 | 0.016 | 0.045 | 0.011 | 2 | 4.09 | Yes | 0.044 | 1 | 1.02 | No | Bioavailable portion (dissolved) not a COPEC |
| Chromium, Dissolved | 0 | 0 | #DIV/0! | 0 | 0.011 | 0 | 0.00 | Yes | 0.044 | 0 | 0.00 | | |
| COBALT | 1 | 0.0019 | 0.002 | 0.0019 | 0.005 | 0 | 0.38 | No | [redacted] | | | | |
| COPPER | 5 | 0.0026 | 0.082 | 0.29 | 0.00654 | 3 | 44.34 | Yes | 2.077 | 0 | 0.14 | No | HQ was below 1 |
| Copper, Dissolved | 3 | 0.002 | 0.002 | 0.0025 | 0.00654 | 0 | 0.38 | No | [redacted] | | | | |
| IRON | 21 | 0.35 | 12.156 | 160 | 1 | 6 | 160.00 | Yes | 0.158 | 21 | 1012.66 | Yes | HQ above 1 for total and dissolved portion |
| Iron, Dissolved | 10 | 0.029 | 1.867 | 8 | 1 | 4 | 8.00 | Yes | 0.158 | 5 | 50.63 | | |
| LEAD | 10 | 0.0015 | 0.044 | 0.3 | 0.00132 | 10 | 227.27 | Yes | 0.255 | 1 | 1.18 | No | Bioavailable portion (dissolved) not a COPEC |
| Lead, Dissolved | 0 | 0 | #DIV/0! | 0 | 0.00132 | 0 | 0.00 | Yes | 0.255 | 0 | 0.00 | | |
| MAGNESIUM | 21 | 9 | 153.095 | 340 | - | - | - | Yes | - | - | - | No | Essential nutrient |
| Magnesium, Dissolved | 21 | 7.5 | 151.357 | 350 | - | - | - | Yes | - | - | - | | |
| MANGANESE | 19 | 0.078 | 0.708 | 0.67 | - | - | - | Yes | 1.1 | 0 | 0.61 | No | HQ was below 1 |
| Manganese, Dissolved | 19 | 0.058 | 0.157 | 0.57 | - | - | - | Yes | 1.1 | 0 | 0.52 | | |
| NICKEL | 2 | 0.01 | 0.016 | 0.022 | 0.08771 | 0 | 0.25 | No | [redacted] | | | | |
| Nickel, Dissolved | 1 | 0.0051 | 0.005 | 0.0051 | 0.08771 | 0 | 0.06 | No | | | | | |
| POTASSIUM | 21 | 1.6 | 52.657 | 130 | - | - | - | Yes | - | - | - | No | Essential nutrient |
| Potassium, Dissolved | 21 | 1.5 | 53.329 | 130 | - | - | - | Yes | | | | | |
| SILVER | 1 | 0.0032 | 0.003 | 0.0032 | 0.000012 | 1 | 266.67 | Yes | 0.00012 | 1 | 26.67 | No | Low frequency of detection |
| SODIUM | 21 | 11 | 1083.952 | 2700 | - | - | | Yes | - | | | No | Essential nutrient |
| Sodium, Dissolved | 21 | 10 | 1073.429 | 2900 | - | - | | Yes | - | | | | |
| VANADIUM | 6 | 0.0033 | 0.009 | 0.024 | 0.019 | 1 | 1.26 | Yes | 0.08 | 0 | 0.30 | No | HQ was below 1 |
| Vanadium, Dissolved | 4 | 0.0031 | 0.004 | 0.007 | 0.019 | 0 | 0.37 | No | [redacted] | | | | |
| ZINC | 16 | 0.0065 | 0.085 | 0.78 | 0.05891 | 3 | 13.24 | Yes | 312.6 | 0 | 0.002 | No | HQ was below 1 |
| Zinc, Dissolved | 5 | 0.0061 | 0.012 | 0.024 | 0.05891 | 0 | 0.41 | No | [redacted] | | | | |
| MERCURY | 2 | 0.00023 | 0.000 | 0.00044 | 0.000012 | 2 | 36.67 | Yes | 0.00004 | 2 | 11.00 | No | Bioavailable portion (dissolved) not a COPEC |
| Mercury, Dissolved | 0 | 0 | #DIV/0! | 0 | 0.000012 | 0 | 0.00 | Yes | 0.00004 | 0 | 0.00 | | |
| CYANIDE | 3 | 0.0057 | 0.010 | 0.015 | 0.0052 | 3 | 2.88 | Yes | 0.0078 | 2 | 1.92 | No | Low magnitude of exceedance |
| **Volatile Organic Compounds (ug/L)** | | | | | | | | | | | | | |
| METHYLENE CHLORIDE | 1 | 2.5 | 2.5 | 2.5 | 1930 | 0 | 0.001 | No | [redacted] | | | | |
| **Semivolatile Organic Compounds (ug/L)** | | | | | | | | | | | | | |
| BENZO(a)ANTHRACENE | 3 | 0.76 | 2.71 | 6.4 | 0.829 | 2 | 7.63 | Yes | 0.65 | 3 | 9.85 | Yes | HQ above 1 |
| BENZO(a)PYRENE | 4 | 0.51 | 1.41 | 3.6 | 0.014 | 4 | 257.14 | Yes | 0.3 | 4 | 12.00 | Yes | HQ above 1 |
| BENZO(b)FLUORANTHENE | 3 | 0.66 | 2.32 | 4.7 | 9.07 | 0 | 0.52 | No | [redacted] | | | | |
| BENZO(g,h,i)PERYLENE | 2 | 0.79 | 1.35 | 1.9 | 7.64 | 0 | 0.25 | No | | | | | |
| BENZO(k)FLUORANTHENE | 2 | 1.3 | 3.20 | 5.1 | 0.0056 | 2 | 910.71 | Yes | 0.0056 | 2 | 910.71 | Yes | HQ above 1 |
| BENZYL BUTYL PHTHALATE | 2 | 0.69 | 2.85 | 5 | 22 | 0 | 0.23 | No | [redacted] | | | | |
| bis(2-ETHYLHEXYL) PHTHALATE | 3 | 0.83 | 1.28 | 1.6 | 0.3 | 3 | 5.33 | Yes | 912 | 0 | 0.00 | No | HQ was below 1 |
| CHRYSENE | 3 | 0.74 | 3.31 | 8.1 | 0.033 | 3 | 245.45 | Yes | 0.033 | 3 | 245.45 | Yes | HQ above 1 |
| DIBENZ(a,h)ANTHRACENE | 1 | 1.3 | 1.30 | 1.3 | 0.0016 | 1 | 812.50 | Yes | 0.0016 | 1 | 812.50 | No | Low frequency of occurrence |
| DI-n-BUTYL PHTHALATE | 2 | 0.36 | 0.65 | 0.93 | 9.4 | 0 | 0.10 | No | [redacted] | | | | |
| DI-n-OCTYLPHTHALATE | 4 | 0.46 | 1.39 | 1.8 | 30 | 0 | 0.06 | No | | | | | |
| FLUORANTHENE | 2 | [illegible] | 0.75 | 2.36 | 39.8 | 0 | 0.07 | No | | | | | |
| INDENO(1,2,3-c,d)PYRENE | 1 | 1.7 | 1.70 | 1.7 | 4.31 | 0 | 0.39 | No | | | | | |
| PYRENE | 2 | 1.4 | 1.50 | 1.6 | 0.3 | 2 | 5.33 | Yes | 11000 | 0 | 0.00 | No | HQ was below 1 |

ROD Table 6

Notes:
Unqualified
J Unqualified
L Estimated value
R Data was rejected
Samples shown in yellow exceed screening value
Samples shown in orange exceed refinement value
Screened COPEC are blacked out

| Table 7: Constituents Detected In Groundwater Above Screening Level During Phase I RI | | | |
|---|---|---|---|
| Constituents | 2000 (mg/L) | Screening Level (mg/L) | Basis for Screening Level |
| Iron | 11.0 (F)<br>12.0 (F)<br>24.0 (F) | 11 | EPA Region 9 PRG |
| Lead | 0.0298 (F) | 0.015 | Primary MCL |
| Aroclor 1242 | 0.0014 (C) | 0.0005 | Primary MCL |
| 1,2-dibromo-3-chloropropane | 0.00086J (C) | 0.0002 | Primary MCL |
| Forest Street (F)<br>5th & Cleveland (C)<br>Lonnie Miller (L)<br><br>J (organic) - constituent was detected above method detection limit but below the reporting limit.<br><br>Screening Criteria is the Drinking Water Standard, if available. If Drinking Water Standard is not available, then Screening Criteria is the lowest of the EPA Region 9 Preliminary Remediation Goals (10/01/02) or the Florida Groundwater Concentration Level (May 1999) | | | |

During Phase I, lead was detected in only 2 of the monitoring well samples. It was detected in the initial sample for FSMW016 at a concentration of 0.0298 mg/L. The well is located in an 8.5-foot-thick ash deposit. It was re-sampled because of the potential for the presence of suspended ash to be affecting the results. The 2 subsequent samples had undetectable lead. The other sample where lead was detected was from the intermediate well FSIW001. It was detected at 0.0016 mg/L, below the screening criterion (Primary MCL) of 0.015 mg/L.

Of the remaining TAL parameters, only aluminum exceeded screening levels, which was detected at 0.47 mg/L in FSMW013. That is above the Florida secondary MCL of 0.2 mg/l for aluminum. This concentration is below the background aluminum concentration in both background monitoring wells. The aluminum does not exceed the health based EPA Region 9 Preliminary Remedial Goal (PRG) for drinking water of 36 mg/l.

Several wells exceeded secondary drinking water standards for iron and manganese. However, secondary standards are not health based. All the manganese concentrations are within the risk range for manganese (i.e., 0.03 to 0.9 ppm) as calculated in the BHHRA and the EPA Region 9 PRG of 0.88 ppm.

During Phase I, eight monitoring wells were sampled and analyzed for TCLs, and 3 additional wells were analyzed for TCLs except VOCs. Only 3 organic parameters were detected in the wells. These were benzo(g,h,I)perylene, carbon disulfide, and cis-1,2 dichloroethene. None of the organic parameters exceeded screening levels which are the primary MCL for cis-1,2 dichloroethene and the Florida Groundwater Cleanup Targets for benzo(g,h,I)perylene and carbon disulfide.

Table 8 shows all the wells that were resampled in January 2003 and the parameters for which they analyzed. The results of the 2002 groundwater resampling are in the Groundwater Resampling Report (July 2003) and summarized in Tables 9, 10, 11 and 12. This most recent groundwater resampling event confirms the conclusions of the 2000 sampling event that groundwater at the Forest Street Incinerator site is not significantly impacted by ash contamination. However, groundwater monitoring will be instituted to verify the "No Action" decision for groundwater.

### 3.7.2 5th and Cleveland Incinerator

The 5th & Cleveland Incinerator site is located approximately 300 feet west of Interstate 95. Groundwater beneath the site flows in a northeasterly direction. The groundwater table in the area under investigation is typically encountered between approximately 4 to 8 feet bgs. The average horizontal hydraulic gradient was calculated to be 0.01.

During the RI, two groundwater sampling events were performed. One event occurred in 2000 and the second event occurred in 2002. Seven monitoring wells were sampled in 2000. No residential wells or community wells near the site were sampled. Table 7 lists all of the constituents detected above respective health based screening levels during the 2000 Phase I RI groundwater sampling event.

During Phase I, seven new monitoring wells, including five site wells and two background wells, were installed as part of the RI. These wells were sampled and analyzed for TCL and TAL parameters. The two background monitoring wells were installed in an area believed to be upgradient of the area of visible ash at the time of installation. However, subsequent soil borings delineated an area of visible ash upgradient of the two background monitoring wells.

The wells were sampled twice, once for lead and once for TAL Lead is below the screening criterion (primary MCL of 0.015 mg/l) in all monitoring well samples. None of the TAL parameters exceeded human health-based screening levels. Iron and/or manganese did exceed the aesthetic criteria for taste in 5 of the monitoring wells sampled. However, secondary standards are not health based. All the manganese concentrations are within the risk range for manganese (i.e., 0.03 to 0.9 ppm) as calculated in the BHHRA and the EPA Region 9 PRG of 0.88 ppm.

Other heavy metals detected below screening criteria in at least 1 monitoring well include arsenic, barium, beryllium, cobalt and vanadium. All were estimated concentrations below practical quantitation limits. A limited number of organic parameters were detected below screening criteria in the monitoring wells. The screening criteria is the primary MCL if available or the EPA Region 9 PRGs or Florida Groundwater Cleanup Target Levels whichever is lower.

# TABLE 1
## GROUNDWATER RESAMPLING SUMMARY
## JACKSONVILLE ASH SITE

| Monitoring Well | TAL | TCL | VOC | DIOXIN |
|---|---|---|---|---|
| BKFSMW001 | X | X | | X |
| BKFSMW002 | X | X | | X |
| FSMW001 | X | X | X | X |
| FSMW002 | X | | | |
| FSMW003 | X | | | |
| FSMW004 | X | | | |
| FSMW005 | X | X | X | X |
| FSMW006 | X | | | |
| FSMW007 | X | | | |
| FSMW008 | X | X | X | X |
| FSMW009 | X | X | X | |
| FSMW010 | X | | | |
| FSMW011 | X | | | |
| FSMW012 | X | X | X | X |
| FSMW013 | X | | | |
| FSMW014 | X | X | X | |
| FSMW015 | X | | | |
| FSMW016 | X | | | |
| FSMW017 | X | X | X | X |
| FSMW018 | X | | | |
| FSMW019 | X | X | X | X |
| **Monitoring Well** | **TAL** | **TCL** | **VOC** | **DIOXIN** |
| BKFCMW001 | X | X | | X |
| BKFCMW002 | X | X | | X |
| FCMW001 | X | X | X | X |
| FCMW002 | X | X | X | X |
| FCMW003 | X | X | X | X |
| FCMW004 | X | X | X | X |
| FCMW005 | X | X | X | X |
| FCMW009 | X | | | |
| **Monitoring Well** | **TAL** | **TCL** | **VOC** | **DIOXIN** |
| BKLMMW001 | X | X | | X |
| BKLMMW002 | X | X | | X |
| LMMW001 | X | X | X | X |
| LMMW002 | X | X | X | X |
| LMMW003 | X | X | X | X |
| LMMW004 | X | X | X | X |
| LMMW005 | X | X | X | X |
| LMMW007 | X | X | X | X |

ROD Table 8

# TABLE 2
# JACKSONVILLE ASH SITE
# GROUNDWATER RESAMPLING TAL SUMMARY

| Analyte | Units | PRG | MINIMUM DETECTED | MAXIMUM DETECTED | NUMBER DETECTED | NUMBER EXCEEDEDING GWCTL | NUMBER OF SAMPLES |
|---|---|---|---|---|---|---|---|
| Aluminum (total) | mg/l | 36 | 0.040B | 0.79 | 14 | 0 | 37 |
| Aluminum (dissolved) | mg/l | 36 | 0.042B | 0.42 | 7 | 0 | 37 |
| Antimony (total) | mg/l | 0.006 | 0.011B | 0.011B | 2 | 1 | 37 |
| Antimony (dissolved) | mg/l | 0.006 | 0.0065B | 0.009B | 2 | 2 | 37 |
| Arsenic (total) | mg/l | 0.05 | 0.018 | 0.043 | 2 | 0 | 37 |
| Arsenic (dissolved) | mg/l | 0.05 | 0.013 | 0.013 | 1 | 0 | 37 |
| Barium (total) | mg/l | 2 | 0.0078B | 0.51 | 37 | 0 | 37 |
| Barium (dissolved) | mg/l | 2 | 0.0078B | 0.5 | 37 | 0 | 37 |
| Beryllium (total) | mg/l | 0.004 | 0.00078B | 0.0021 | 2 | 0 | 37 |
| Beryllium (dissolved) | mg/l | 0.004 | 0.00082B | 0.002 | 2 | 0 | 37 |
| Cadmium (total) | mg/l | 0.005 | 0.00078B | 0.0011B | 3 | 0 | 37 |
| Cadmium (dissolved) | mg/l | 0.005 | 0.00089B | 0.0012B | 2 | 0 | 37 |
| Calcium (total) | mg/l | NA | 0.35B | 200 | 37 | NA | 37 |
| Calcium (dissolved) | mg/l | NA | 0.38B | 200 | 37 | NA | 37 |
| Chromium (total) | mg/l | 0.1 | 0.0019B | 0.003B | 2 | 0 | 37 |
| Chromium (dissolved) | mg/l | 0.1 | 0.0026B | 0.083 | 2 | 0 | 37 |
| Cobalt (total) | mg/l | 0.73 | 0.0028B | 0.004B | 3 | 0 | 37 |
| Cobalt (dissolved) | mg/l | 0.73 | 0.0015B | 0.004B | 6 | 0 | 37 |
| Copper (total) | mg/l | 1.5 | 0.00099B | 0.021B | 28 | 0 | 37 |
| Copper (dissolved) | mg/l | 1.5 | 0.00095B | 0.03 | 26 | 0 | 37 |
| Iron (total) | mg/l | 11 | 0.032B | 13 | 37 | 2 | 37 |
| Iron (dissolved) | mg/l | 11 | 0.042B | 11 | 37 | 0 | 37 |
| Lead (total) | mg/l | 0.015 | 0.0015B | 0.012 | 8 | 0 | 37 |
| Lead (dissolved) | mg/l | 0.015 | 0.0016B | 0.0016B | 2 | 0 | 37 |
| Magnesium (total) | mg/l | NA | 0.54B | 33 | 37 | NA | 37 |
| Magnesium (dissolved) | mg/l | NA | 0.57B | 33 | 37 | NA | 37 |
| Manganese (total) | mg/l | 0.88 | 0.0025B | 0.99 | 35 | 1 | 37 |
| Manganese (dissolved) | mg/l | 0.88 | 0.0025B | 0.58 | 35 | 1 | 37 |
| Nickel (total) | mg/l | 0.1 | 0.0047U | 0.0047U | 0 | 0 | 37 |
| Nickel (dissolved) | mg/l | 0.1 | 0.012B | 0.012B | 1 | 0 | 37 |
| Potassium (total) | mg/l | NA | 0.22B | 66 | 37 | NA | 37 |
| Potassium (dissolved) | mg/l | NA | 0.22B | 69 | 37 | NA | 37 |
| Selenium (total) | mg/l | 0.05 | 0.0042U | 0.0042U | 0 | 0 | 37 |
| Selenium (dissolved) | mg/l | 0.05 | 0.0042U | 0.0042U | 0 | 0 | 37 |
| Silver (total) | mg/l | 0.18 | 0.0019U | 0.0019U | 0 | 0 | 37 |
| Silver (dissolved) | mg/l | 0.18 | 0.0019U | 0.0019U | 0 | 0 | 37 |
| Sodium (total) | mg/l | NA | 2.1B | 100 | 37 | NA | 37 |
| Sodium (dissolved) | mg/l | NA | 2.2B | 120 | 37 | NA | 37 |
| Thallium (total) | mg/l | 0.002 | 0.010U | 0.010U | 0 | 0 | 37 |
| Thallium (dissolved) | mg/l | 0.002 | 0.010U | 0.010U | 0 | 0 | 37 |
| Vanadium (total) | mg/l | 0.26 | 0.0022B | 0.0065B | 8 | 0 | 37 |
| Vanadium (dissolved) | mg/l | 0.26 | 0.0028B | 0.0067B | 7 | 0 | 37 |
| Zinc (total) | mg/l | 11 | 0.0072B | 0.63 | 26 | 0 | 37 |
| Zinc (dissolved) | mg/l | 11 | 0.0059B | 0.66 | 20 | 0 | 37 |
| Mercury (total) | mg/l | 0.002 | 0.000079B | 0.000079B | 1 | 0 | 37 |
| Mercury (dissolved) | mg/l | 0.002 | 0.000092B | 0.000092B | 1 | 0 | 37 |
| Cyanide (total) | mg/l | 0.2 | 0.0062B | 0.014 | 4 | 0 | 37 |

PRGs are the primary drinking water standards. If a pmary drinking water standard is not available for a particular constituent, then EPA Region 9 PRGs for tap water are used.
U means that the compound was analyzed for but not detected.
B(inorganic) means that the analyte was detected above the method detection limit but below the reporting limit.

ROD Table 9

# TABLE 4
## JACKSONVILLE ASH SITE
## GROUNDWATER RESAMPLING SVOC SUMMARY

| Analyte | Units | PRG | MINIMUM DETECTED | MAXIMUM DETECTED | NUMBER DETECTED | NUMBER EXCEEDING GWCTL | NUMBER OF SAMPLES |
|---|---|---|---|---|---|---|---|
| Phenol | ug/l | 22,000 | 10U | 10U | 0 | 0 | 25 |
| bis(2-Chloroethyl)ether | ug/l | 0.001 | 10U | 10U | 0 | 0 | 25 |
| 2-Chlorophenol | ug/l | 30 | 10U | 10U | 0 | 0 | 25 |
| 2-Methylphenol | ug/l | 1,800 | 10U | 10U | 0 | 0 | 25 |
| 2,2'-Oxybis(1-Chloropropane) | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| 3-Methylphenol | ug/l | 1,800 | 10U | 10U | 0 | 0 | 25 |
| N-Nitroso-di-n-propylamine | ug/l | 0.001 | 10U | 10U | 0 | 0 | 25 |
| Hexachloroethane | ug/l | 4.8 | 10U | 10U | 0 | 0 | 25 |
| Nitrobenzene | ug/l | 3.4 | 10U | 10U | 0 | 0 | 25 |
| Isophorone | ug/l | 71 | 10U | 10U | 0 | 0 | 25 |
| 2-Nitrophenol | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| 2,4-Dimethylphenol | ug/l | 730 | 10U | 10U | 0 | 0 | 25 |
| bis(2-Chloroethoxy)methane | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| 2,4-Dinitrophenol | ug/l | 73 | 10U | 10U | 0 | 0 | 25 |
| Naphthalene | ug/l | 6.2 | 10U | 10U | 0 | 0 | 25 |
| 4-Chloroaniline | ug/l | 150 | 10U | 10U | 0 | 0 | 25 |
| Hexachlorobutadiene | ug/l | 0.86 | 10U | 10U | 0 | 0 | 25 |
| 4-Chloro-3-methylphenol | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| 2-Methylnaphthalene | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| Hexachlorocyclopentadiene | ug/l | 50 | 10U | 10U | 0 | 0 | 25 |
| 2,4,6-Trichlorophenol | ug/l | 3.6 | 10U | 10U | 0 | 0 | 25 |
| 2,4,5-Trichlorophenol | ug/l | 3,600 | 25U | 25U | 0 | 0 | 25 |
| 2-Chloronaphthalene | ug/l | 490 | 10U | 10U | 0 | 0 | 25 |
| 2-Nitroanaline | ug/l | 1 | 25U | 25U | 0 | 0 | 25 |
| Dimethylphthalate | ug/l | 360,000 | 10U | 10U | 0 | 0 | 25 |
| Acenaphthalene | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| 3-Nitroanaline | ug/l | NA | 25U | 25U | 0 | 0 | 25 |
| Acenaphthene | ug/l | 370 | 10U | 10U | 0 | 0 | 25 |
| 2,4-Dinitrophenol | ug/l | 73 | 25U | 25U | 0 | 0 | 25 |
| 4-Nitrophenol | ug/l | NA | 25U | 25U | 0 | 0 | 25 |
| Dibenzofuran | ug/l | 24 | 10U | 10U | 0 | 0 | 25 |
| 2,4-Dinitrotoluene | ug/l | 73 | 10U | 10U | 0 | 0 | 25 |
| 2,6-Dinitrotoluene | ug/l | 36 | 10U | 10U | 0 | 0 | 25 |
| Diethylphthalate | ug/l | 29,000 | 10U | 10U | 0 | 0 | 25 |
| 4-Chlorophenylphenyl ether | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| Fluorene | ug/l | 240 | 10U | 10U | 0 | 0 | 25 |
| 4-Nitroanaline | ug/l | NA | 25U | 25U | 0 | 0 | 25 |
| 4,6-Dinitro-2-methylphenol | ug/l | NA | 25U | 25U | 0 | 0 | 25 |
| N-Nitrosodiphenyl ether | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| 4-Bromophenylphenyl ether | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| Hexachlorobenzene | ug/l | 1 | 10U | 10U | 0 | 0 | 25 |
| Pentachlorophenol | ug/l | 1 | 25U | 25U | 0 | 0 | 25 |
| Phenanthrene | ug/l | NA | 10U | 10U | 0 | 0 | 25 |
| Anthracene | ug/l | 1,800 | 10U | 10U | 0 | 0 | 25 |
| Di-n-butylphthalate | ug/l | 3,600 | 0.38J | [illegible].3J | 6 | 0 | 25 |
| Fluoranthene | ug/l | 1,500 | 10U | 10U | 0 | 0 | 25 |
| Pyrene | ug/l | 180 | 10U | 10U | 0 | 0 | 25 |
| Butylbenzylphthalate | ug/l | 7,300 | 10U | 10U | 0 | 0 | 25 |
| 3,3'-Dichlorobenzidine | ug/l | 0.15 | 10U | 10U | 0 | 0 | 25 |
| Benzo(a)anthracene | ug/l | 0.09 | 10U | 10U | 0 | 0 | 25 |
| bis(2-Ethylhexyl)phthalate | ug/l | 6 | 0.51J | 0.51J | 1 | 0 | 25 |
| Chrysene | ug/l | 9.2 | 10U | 10U | 0 | 0 | 25 |
| Di-n-octylphthalate | ug/l | 1,500 | 10U | 10U | 0 | 0 | 25 |
| Benzo(b)fluoranthene | ug/l | 0.09 | 10U | 10U | 0 | 0 | 25 |
| Benzo(k)fluoranthene | ug/l | 0.9 | 10U | 10U | 0 | 0 | 25 |
| Benzo(a)pyrene | ug/l | 0.2 | 10U | 10U | 0 | 0 | 25 |
| Indeno(1,2,3-cd)pyrene | ug/l | 0.09 | 1J | 1J | 1 | 1 | 25 |
| Dibenzo(a,h)anthracene | ug/l | 0.009 | 0.88J | 0.88J | 1 | 1 | 25 |
| Benzo(g,h,i)perylene | ug/l | NA | 0.75J | 4.1J | 8 | 0 | 25 |
| Carbazole | ug/l | 3.4 | 10U | 10U | 0 | 0 | 25 |
| 1-Methylnaphthalene | ug/l | NA | 10U | 10U | 0 | 0 | 25 |

PRGs are the primary drinking water standards. If a primary drinking water standard is not available for a particular constituent, then EPA Region 9 PRGs for tap water are used.
NA means not available at the time of this report
PRG is the Primary Drinking Water Standard MCL, if available, or the EPA Relon 9 tap water PRG.
U means that the compound was analyzed for but not detected.
J means that the analyte was detected above the bmethod detection limit but below the reporting limit.

ROD Table 10

# TABLE 6
# JACKSONVILLE ASH SITE
# GROUNDWATER RESAMPLING PESTICIDES/PCBS SUMMARY

| Analyte | Units | PRG | MINIMUM DETECTED | MAXIMUM DETECTED | NUMBER DETECTED | NUMBER EXCEEDING GCTL | NUMBER OF SAMPLES |
|---|---|---|---|---|---|---|---|
| Alpha-BHC | ug/l | 0.011 | 0.050U | 0.053U | 0 | 0 | 25 |
| Beta-BHC | ug/l | 0.037 | 0.014JP | 0.014JP | 1 | 0 | 25 |
| Delta-BHC | ug/l | 0.052 | 0.050U | 0.050U | 0 | 0 | 25 |
| Heptachlor | ug/l | 0.4 | 0.050U | 0.050U | 0 | 0 | 25 |
| Aldrin | ug/l | 0.004 | 0.050U | 0.050U | 0 | 0 | 25 |
| Heptachlor Epoxide | ug/l | 0.2 | 0.050U | 0.050U | 0 | 0 | 25 |
| Endosulfan | ug/l | 220 | 0.050U | 0.050U | 0 | 0 | 25 |
| Dieldrin | ug/l | 0.004 | 0.10U | 0.11U | 0 | 0 | 25 |
| 4,4'-DDE | ug/l | 0.2 | 0.10U | 0.10U | 0 | 0 | 25 |
| Endrin | ug/l | 11 | 0.10U | 0.10U | 0 | 0 | 25 |
| Endrin Aldehyde | ug/l | 2 | 0.10U | 0.10U | 0 | 0 | 25 |
| Endosulfan II | ug/l | 220 | 0.10U | 0.10U | 0 | 0 | 25 |
| 4,4'-DDD | ug/l | 0.28 | 0.10U | 0.10U | 0 | 0 | 25 |
| Endosulfan Sulfate | ug/l | NA | 0.10U | 0.10U | 0 | 0 | 25 |
| 4,4'-DDT | ug/l | 0.2 | 0.10U | 0.10U | 0 | 0 | 25 |
| Endrin Ketone | ug/l | NA | 0.10U | 0.10U | 0 | 0 | 25 |
| Methoxychlor | ug/l | 40 | 0.50U | 0.50U | 0 | 0 | 25 |
| Alpha-Chlordane | ug/l | 2 | 0.050U | 0.050U | 0 | 0 | 25 |
| Gamma-Chlordane | ug/l | 2 | 0.050U | 0.050U | 0 | 0 | 25 |
| Toxaphene | ug/l | 3 | 5.0U | 5.0U | 0 | 0 | 25 |
| Arochlor-1016 | ug/l | 0.5 | 1.0U | 1.0U | 0 | 0 | 25 |
| Arochlor-1221 | ug/l | 0.5 | 2.0U | 2.0U | 0 | 0 | 25 |
| Arochlor-1232 | ug/l | 0.5 | 1.0U | 1.0U | 0 | 0 | 25 |
| Arochlor-1242 | ug/l | 0.5 | 1.0U | 1.0U | 0 | 0 | 25 |
| Arochlor-1248 | ug/l | 0.5 | 1.0U | 1.0U | 0 | 0 | 25 |
| Arochlor-1254 | ug/l | 0.5 | 1.0U | 1.0U | 0 | 0 | 25 |
| Arochlor-1260 | ug/l | 0.5 | 1.0U | 1.0U | 0 | 0 | 25 |

PRGs are the primary drinking water standards. If a primary drinking water standard is not available for a particular constituent, *then EPA Region 9 PRGs for tap water are used.*
U means that the compound was analyzed for but not detected.
J (organic) means that the reported value is less than the Project Reporting Limit but greater than the Method detection Limit.
P is the flag used for a pestcide analyte when there is greater than 25% difference for detected concentrations between the two columns.

ROD Table 11

# TABLE 8
## JACKSONVILLE ASH SITE
## GROUNDWATER RESAMPLING VOC SUMMARY

| Analyte | Units | PRG | MINIMUM DETECTED | MAXIMUM DETECTED | NUMBER DETECTED | NUMBER EXCEEDING GWCTL | NUMBER OF SAMPLES |
|---|---|---|---|---|---|---|---|
| Chloromethane | ug/l | 1.5 | 10U | 10U | 0 | 0 | 19 |
| Bromomethane | ug/l | 8.7 | 10U | 10U | 0 | 0 | 19 |
| Vinyl Chloride | ug/l | 1 | 10U | 10U | 0 | 0 | 19 |
| Chloroethane | ug/l | NA | 10U | 10U | 0 | 0 | 19 |
| Methylene Chloride | ug/l | 5 | 10U | 10U | 0 | 0 | 19 |
| Acetone | ug/l | 610 | 12 | 13J | 2 | 0 | 19 |
| Carbon Disulfide | ug/l | 1,000 | 10U | 10U | 0 | 0 | 19 |
| 1,1-Dichloroethene | ug/l | 7 | 10U | 10U | 0 | 0 | 19 |
| cis-1,2-Dichloroethene | ug/l | 70 | 6.1J | 27 | 2 | 0 | 19 |
| trans-1,2-Dichloroethene | ug/l | 100 | 10U | 10U | 0 | 0 | 19 |
| Chloroform | ug/l | 80 | 10U | 10U | 0 | 0 | 19 |
| 1,2-Dichloroethane | ug/l | 3 | 10U | 10U | 0 | 0 | 19 |
| 2-Butanone | ug/l | NA | 10U | 10U | 0 | 0 | 19 |
| 1,1,1-Trichloroethane | ug/l | 200 | 10U | 10U | 0 | 0 | 19 |
| Carbon Tetrachloride | ug/l | 3 | 10U | 10U | 0 | 0 | 19 |
| Bromodichloromethane | ug/l | 0.18 | 10U | 10U | 0 | 0 | 19 |
| 1,1,2,2-Tetrachloroethane | ug/l | 0.0055 | 10U | 10U | 0 | 0 | 19 |
| 1,2-Dichloropropane | ug/l | 5 | 10U | 10U | 0 | 0 | 19 |
| trans-1,3-Dichloropropene | ug/l | 0.4 | 10U | 10U | 0 | 0 | 19 |
| Trichloroethene | ug/l | 3 | 10U | 10U | 0 | 0 | 19 |
| Dibromochloromethane | ug/l | 80 | 10U | 10U | 0 | 0 | 19 |
| 1,1,2-Trichloroethane | ug/l | 5 | 10U | 10U | 0 | 0 | 19 |
| Benzene | ug/l | 1 | 10U | 10U | 0 | 0 | 19 |
| cis-1,3-Dichloropropene | ug/l | 0.4 | 10U | 10U | 0 | 0 | 19 |
| Bromoform | ug/l | 80 | 10U | 10U | 0 | 0 | 19 |
| 2-Hexanone | ug/l | 1,200 | 10U | 10U | 0 | 0 | 19 |
| 4-Methyl-2-Pentanone | ug/l | NA | 10U | 10U | 0 | 0 | 19 |
| Tetrachloroethene | ug/l | 3 | 10U | 10U | 0 | 0 | 19 |
| Toluene | ug/l | 1,000 | 10U | 10U | 0 | 0 | 19 |
| Chlorobenzene | ug/l | 100 | 10U | 10U | 0 | 0 | 19 |
| Ethylbenzene | ug/l | 700 | 10U | 10U | 0 | 0 | 19 |
| Styrene | ug/l | 100 | 10U | 10U | 0 | 0 | 19 |
| Xylenes | ug/l | 10,000 | 10U | 10U | 0 | 0 | 19 |
| Dichlorodifluoromethane | ug/l | 390 | 10U | 10U | 0 | 0 | 19 |
| Trichlorofluoromrethane | ug/l | 1,300 | 10U | 10U | 0 | 0 | 19 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/l | NA | 10U | 10U | 0 | 0 | 19 |
| Methyl t-butyl ether | ug/l | 13 | 10U | 10U | 0 | 0 | 19 |
| Isopropylbenzene | ug/l | NA | 10U | 10U | 0 | 0 | 19 |
| 1,3-Dichlorobenzene | ug/l | 600 | 10U | 10U | 0 | 0 | 19 |
| 1,4-Dichlorobenzene | ug/l | 75 | 10U | 10U | 0 | 0 | 19 |
| 1,2-Dichlorobenzene | ug/l | 600 | 10U | 10U | 0 | 0 | 19 |
| 1,2-Dibromo-3-chloropropane | ug/l | 0.2 | 10U | 10U | 0 | 0 | 19 |
| 1,2,4-Trichlorobenzene | ug/l | 70 | 10U | 10U | 0 | 0 | 19 |
| 1,2-Dibromoethane | ug/l | 0.00076 | 10U | 10U | 0 | 0 | 19 |

The PRGs are the Primary Drinking Water Standards, if available, or the EPA Region 9 tap water PRGs.
NA means not available at the time of this report
U means that the compound was analyzed for but not detected.
J means that the analyte was detected above the method detection limit but below the reporting limit.

ROD Table 12

Table 8 shows all the wells that were resampled in January 2003 and analyzed for TAL metals, TCL organics, volatile organics and dioxins/furans. The results of the 2002 resampling are in the Groundwater Resampling Report (July 2003) and summarized in Tables 9, 10, 11 and 12. This most recent groundwater resampling event confirms the conclusions of the 2000 sampling event that groundwater at the 5th & Cleveland Incinerator Site is not significantly impacted by ash contamination. However, groundwater monitoring will be instituted to verify the "No Action" decision for groundwater.

### 3.7.3 Lonnie C. Miller, Sr. Park

The Lonnie C. Miller, Sr. Park site is located west of the Ribault River. Groundwater beneath the site flows toward the river in an east to northeasternly direction. The groundwater table in the area is typically encountered between approximately 2.5 feet to 9.5 feet bgs. The average horizontal hydraulic gradient was calculated to be 0.005.

Eight new monitor wells (2 background and 6 site) were installed as part of the Phase I RI. These wells were sampled and analyzed initially for lead only. In the second round all wells were sampled and analyzed for TCL and TAL parameters. The two new background monitor wells were installed upgradient of the area of visible ash. The background wells were sampled twice, once for total lead and once for TAL and TCL (except VOCs).

In background monitor wells, lead was not detected in any of the four samples. Only one other inorganic parameter was found in the background samples (barium); estimated concentrations below quantitation limits were found for barium in both background wells. No organics were found in the background wells.

Lead is below the screening criteria (primary MCL of 0.015 mg/l) in all monitor well samples. It was detected in two monitor wells (LMMW001 and the initial sampling only of LMMW002) at estimated concentrations of 0.0019 and 0.001 mg/L, respectively. These 2 wells are located in the area of thickest ash deposits, in the northern portion of the site.

Aluminum was the only TAL parameter that exceeded screening levels. Aluminum exceeded the secondary MCL of 0.2 mg/l in one well, LMMW001. Iron and/or manganese did exceed the aesthetic criteria for taste in 11 of the monitor wells samples, including 1 of the background monitor wells for iron. However, secondary standards are not health based. All the manganese concentrations are within the risk range for manganese (i.e., 0.03 to 0.9 ppm) as calculated in the BHHRA and the EPA Region 9 PRG of 0.88 ppm.

A limited number of organic parameters were detected in the monitor wells. Two organic parameters were detected at low concentrations in LMMW005 (cis-1,2-dichloroethylene and vinyl chloride. This well is close to Moncrief Road and within the area of ash disposal. The pesticide endosulfan as well as cresol and phenol were detected in LMMW007; this is a deep well below the thickest portion of ash disposal. None of the organic parameters exceeded screening levels. The screening criteria is the primary MCL if available or the EPA Region 9 PRGs or Florida Groundwater Cleanup Target Levels whichever is lower.

Table 8 shows all the wells that were resampled in January 2003 and analyzed for TAL metals, TCL organics, volatile organics and dioxins/furans. The results of the 2002 resampling are in the Groundwater Resampling Report (July 2003) and summarized in Tables 9, 10, 11 and 12. This most recent groundwater resampling event confirms the conclusions of the 2000 sampling event that groundwater at the Lonnie C. Miller Park site is not significantly impacted by ash contamination. However, groundwater monitoring will be instituted to verify the "No Action" decision for groundwater.

### 3.8 Likelihood for Soil Migration

The likelihood for migration of COCs in soil is low. Heavy rains could cause existing surface soil contamination to migrate from the sites into creeks or rivers in storm water runoff but is likely to be minimum due to the presence of grass and other types of cover (e.g., clean soil, gravel) over contaminated soil. The presence of grass and other types of cover (e.g., clean soil, gravel) over contaminated soil also minimizes the migration of soil via wind. Contaminants of concern located in soil do not appear to be migrating to groundwater based on the result of groundwater monitoring.

### 3.9 Likelihood for Surface Water Migration

The likelihood for surface water migration is low. Sampling to date has indicated that surface water does not contain significant levels of Site COCs.

### 3.10 Likelihood for Sediment Migration

Concern over the likelihood for sediment migration is not significant. Exceedences of ecological sediment RGs in McCoy's Creek and the Ribault River sediments next to the sites have been found to be similar to sediment background concentrations upstream of the sites. This evaluation indicates that the sites have not significantly contaminated the sediment above levels already present in the surface water bodies. With the stabilization of the streams banks during the remedial action, the concentrations of site-related COCs in the streams is expected to decrease.

### 3.11 Likelihood for Groundwater Migration

Concern over the likelihood for groundwater migration of COCs from the sites is not significant. Groundwater sampling has not indicated Site contamination in need of remediation.

# PART 4: CURRENT AND POTENTIAL FUTURE LAND AND WATER USE

## 4.1 Current And Potential Future Land Use

### 4.1.1 Forest Street Current Land Use

The Forest Street Incinerator site is located northwest of the intersection of Margaret Street and Forest Street, and south of McCoy's Creek. The site consists of approximately 27 acres of land in a predominately residential area. The site is currently occupied by the Forest Park Head Start School, a Parks and Recreation Center, an open lot where the incinerator was located and surrounding residential and commercial areas. The site is the location of a former municipal solid waste incinerator, which was operated by the City from the 1910's to the 1969, and the surrounding area was used for ash disposal. Ash deposits have been documented in areas to the east, south, and west of the site. The former incinerator area at the northeastern corner of the site is currently grassed and enclosed by a chain-link fence to minimize human access. The area is maintained by mowing. The land uses are institutional, recreational, open land and primarily residential in the surrounding area with some commercial usage.

The nearest house is located approximately 200 feet from the site boundary. The Forest Park Head Start School, with a staff of approximately 122 workers and 740 students, is situated along the west side of the site and includes a school building and several playground areas that are used by the students. The school property is enclosed by a chain-link fence. The Parks and Recreation Center contains two large ball fields that are routinely maintained by mowing. This open recreational area is located along the southern portion of the site.

In 1990, the population in Jacksonville was 906,727. It is estimated that the Jacksonville population increased to 1,044,684 by 1998 (U.S. Census Bureau, 1999). According to the 1990 U.S. Census, the total population in the four census tracts within one mile of the site is approximately 11,952. African-Americans comprise 59 percent of the population, Caucasians approximately 39 percent, and Hispanics about 2 percent. The median age is approximately 40, and the median family income is approximately $15,500.

#### 4.1.1.1 Forest Street Potential Future Land Use

The City of Jacksonville enacted Ordinance 2003-892E on August 12, 2003. This Ordinance requires all development in the area of Forest Street Incinerator (and areas outside the site) to follow the North Riverside Action Plan (NR Action Plan) developed with the help of the North Riverside Community Development Corporation (TAP Community Group) and area business owners. The Ordinance and the NR Action Plan are included in Appendix E of this ROD along with zoning maps of the three properties. Some areas of the Forest Street site will change to light industrial/commercial to create a buffer between residential housing (which in some areas is dispersed among light industrial buildings) and commercial properties. The residential houses in the converted areas will be removed from the commercially zoned areas. This is discussed in Section 7 of the NR Action Plan in Appendix E of this ROD.

### 4.1.2 5th & Cleveland Current Land Use

The 5th & Cleveland Incinerator site is located northeast of the intersection of 5th & Cleveland Street, in a predominately residential area approximately 1 mile north of downtown Jacksonville, Florida. The site is currently used as Emmett Reed Park, a public park, and Emmett Reed Community Center and residential areas. Emmett Reed Park contains two basketball courts, a baseball diamond, a picnic area, and two buildings. The Emmett Reed Community Center comprises one building and a playground is located adjacent to this building. The site is the location of a former municipal solid waste incinerator, which was operated by the City from the 1910s to the 1969. Ash deposits have been documented in residential areas to the east, south, and west of the main former incinerator site.

Doll's and Jill's Day Care Center is located east of the site, and public housing units are located northwest of the site. The Mt. Herman Elementary School is located northeast of the site behind the community center, and the H.R. Lewis Petroleum Company and residential properties are located south and east of the site. The Ford Elementary School is approximately 0.25 mile south of the site on 3rd Street.

According to the 1990 U.S. Census, approximately 3,939 people (6 percent Caucasian, 90 percent African-American, and 1.5 percent Hispanic) live within ½ mile of the site. Approximately 16 percent of the population is under the age of 9, and 18 percent of the population is over the age of 65. Approximately 48 percent of the population over age 25 graduated from high school. Approximately 37 percent have less than a ninth grade education. The median family income is about $17,814. Approximately 85 percent of the housing units are occupied.

#### 4.1.2.1 5th & Cleveland Future Land Use

A tennis facility and courts are planned for the Emmett Reed Park which presently contains the baseball field and basketball courts (see Figure 6). The remediation of Emmett Reed Park is occurring under a non-time critical removal described in Section 2.6.1 of this ROD. After remediation, the tennis courts, tennis facility, basketball court and parking lot will be constructed.

### 4.1.3 *Lonnie C. Miller Sr. Park Current Land Use*

The Lonnie C. Miller, Sr., Park site is located on Price Road near the intersection of Moncrief Road and Soutel Road. The site occupies approximately 100 acres and is currently used as a municipal park that includes a playground, picnic shelters, a small fishpond, and public restrooms. The site was used by the City of Jacksonville for ash disposal of municipal ash from the 5th & Cleveland Incinerator site, which operated from 1910's to 1969. Ash deposits have been documented on, east, and south of the site. The park is bounded to the south and northeast by private residences, to the west and northwest by a light commercial development, and to the east by the Ribault River.

According to the 1990 U.S. Census, approximately 16,752 people (7.7 percent Caucasian, 91.9 percent African-American, and 0.5 percent Hispanic) live in the general area of the site.

Approximately 15 percent of the population is under the age of 9, and 14 percent of the population is over the age of 60. The median age is 33.8. The median family income is about $26,189. Approximately 95 percent of the housing units are occupied.

## 4.2 Current And Potential Future Water Use

### 4.2.1 Hydrogeology of the Jacksonville Area

The geology in the Jacksonville area can be divided into three hydrostratigraphic units: the surficial aquifer system, the intermediate aquifer/confining unit, and the Floridan aquifer system. The surficial aquifer system sediments are 50 to 100 feet thick in Duval County. The water table is found between 1 and 10 feet below land surface (bls). Recharge to the water-table zone is primarily from local rainfall. The water-table zone of the surficial aquifer system is used for limited irrigation, stock, and domestic uses. The "Rock" limestone aquifer is the major water-yielding zone in the surficial aquifer system and is tapped by numerous private and small community supply wells in Duval County. Well yields from the limestone unit average 30 to 100 gallons per minute (gpm) with peaks as high as 200 gpm. Water level elevations of the water table zone and the limestone unit are similar; however, when water levels in the water table aquifer are higher than those of the limestone unit, a downward potential, albeit small, may exist.

The surficial aquifer system is underlain by the intermediate aquifer system/confining unit, which is between 250 to 500 feet thick. Wells in this zone will yield at least 20 gallons per minute. The Floridan aquifer system is the principal source of fresh water in the area and is found under artesian conditions between 500 to 550 feet bls in the Jacksonville area. Regional flow direction within the Floridan aquifer system is to the east-northeast. The City of Jacksonville municipal water supply system is derived from wells that tap the Floridan aquifer system 1,000 to 1,500 feet deep. The majority of residents located within a 4-mile radius of the site obtain drinking water from the City of Jacksonville municipal water supply system, which is derived from wells that are completed in the Floridan aquifer system. Due to its considerable thickness, low permeability, and high potentiometric surface elevation, generally no recharge of the Floridan aquifer system takes place in the Jacksonville area.

### 4.2.2 Forest Street Current Water Uses

The majority of residents located within a 4-mile radius of the site obtain drinking water from the City of Jacksonville municipal water supply system, which is derived from wells that are completed in the Floridan aquifer. A number of community and small public well systems are located within 4 miles of the site. Two of the larger systems include the Jacksonville Suburban Utilities Magnolia Gardens and Lake Forest wells. These wells obtain potable water from the Floridan aquifer system and are located between 3 and 4 miles northwest of the site. The Jacksonville Suburban Utilities Magnolia Gardens and Lake Forest well systems collectively provide potable drinking water to approximately 5,200 people. Approximately 421,465 people obtain potable drinking water from municipal wells located within 4 miles of the site and completed in the Floridan aquifer system. Due to its considerable thickness, low permeability, and high potentiometric surface elevation, generally no recharge of the Floridan aquifer system takes place in the Jacksonville area. The Floridan Aquifer is not affected by site contamination.

Several private wells located within 4 miles of the site are completed in the surficial aquifer. Private wells generally are approximately 40 to 100 feet deep. Approximately 12 persons obtain potable water from private wells within 1 mile of the site.

The Forest Street Incinerator site is located south of McCoy's Creek, with groundwater beneath the site flowing toward the creek in a northeasterly direction. The general overland flow pattern of the area is interrupted by two intervening paved roads, Margaret Street and McCoy's Creek Boulevard. The groundwater table in the area is typically encountered between approximately 4 to 12 feet below ground surface. McCoy's Creek flows east approximately 1 mile and converges with the St. Johns River, of which McCoy's Creek is a small tributary, and where the 15-mile target distance limit is completed. This portion of the St. Johns River is tidally-influenced and estuarine conditions predominate throughout most of the surface water migration pathway. The northern portion of the site lies within the 100-year flood zone of the St. Johns River drainage system, and deposits of incinerator ash have been observed on the southern banks of McCoy's Creek within this flood zone. The surface water is not used for drinking water or recreation.

#### 4.2.3 5th & Cleveland Current Water Uses

The majority of residents located within a 4-mile radius of the site obtain drinking water from the City of Jacksonville municipal water supply system, which is derived from wells that are completed in the Floridan aquifer system. The municipal water system supplies approximately 385,480 people within the targeted area. A number of small community water systems is also located within 4 miles of the site, including the Jacksonville Suburban Utilities, Magnolia Gardens, and Lake Forest wells. These wells obtain water potable water from the Floridan aquifer system, and are located between 3 and 4 miles northwest and north of the site. These water systems collectively provide potable water to approximately 5,200 people. The Floridan Aquifer system is not affected by the site.

Several private wells located within 4 miles of the site are completed in the surficial aquifer. There are approximately 39 residents obtaining potable water from private wells located within a 1-mile radius of the site.

Surface drainage in the study area generally flows northeast to a channelized subsurface unnamed creek. The unnamed creek flows to the east of the site and discharges into Hogan Creek about 0.5 mile downstream, which subsequently discharges into the St. Johns River. The surface water is not used for drinking water or recreation.

#### 4.2.4 Lonnie C. Miller Park Current Water Uses

Most residents within a 4-mile radius of the site obtain drinking water from the City of Jacksonville municipal water supply system, which is derived from wells that are completed in the Floridan aquifer system. The municipal water system supplies approximately 102,755 people within the targeted area. A number of small community water systems is also located within 4 miles of the site, including the Jacksonville Suburban Utilities, Magnolia Gardens, and Lake Forest wells. These wells obtain water potable water from the Floridan aquifer system, and are located between 1.25 and 2.75 miles southeast of the site. These water systems collectively provide potable water to approximately 5,200 people. The Floridan Aquifer system is not affected by the site.

Several private wells located within 4 miles of the site are completed in the surficial aquifer. There are approximately 206 residents obtaining potable water from private hand-dug wells located within a 1-mile radius of the site..

Surface drainage in the study area generally flows a drainage ditch that is located on the eastern portion of the site. This ditch is the topographic divide between the western and eastern portions of the site. The ditch conveys water to the northeast to a small tributary of the Ribault River. The tributary flows south and discharges into the Ribault River approximately 0.25 mile downstream of the site. The Ribault River is used for fishing and recreation but not for drinking water.

# PART 5 : SUMMARY OF HUMAN HEALTH RISK ASSESSMENT

## 5.1 Summary of Site Risks - Human Health Risk Assessment

The Baseline Human Health Risk Assessments (BHHRA) estimate what risks the Site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The BHHRAs consist of the following activities:

- Data Collection and Evaluation
- Exposure Assessment
- Toxicity Assessment
- Risk Characterization
- Remedial Goal Options

The following sub-parts of the ROD will summarize each of the above activities which together formed the 2002 and 2003 BHHRAs for the Site.

## 5.2 Data Collection and Evaluation

This step in the risk assessment process involves gathering and analyzing the site data relevant to human health and identifying the contaminants present at the site that will be included in the risk assessment process. The BHHRA was based on data from the1996 Site Investigation (SI) and the analytical data collected during the Phase I Remedial Investigation conducted in 2000.

### 5.2.1 Conceptual Site Model for Risk Assessment Purposes

#### 5.2.1.1 *Forest Street Incinerator*

For purposes of the risk assessment, the Forest Street Incinerator site was divided into three primary areas. Area 1 consists of the Forest Street site proper and contains the Parks and Recreation Center, the former incinerator area, and a section of Forest Park Head Start School. Area 2 consists of the industrial areas to the north and east of Area 1. Area 2 was divided into three sections: the area north of McCoy's Creek, the Florida Department of Transportation (FDOT) I-10/I-95 Interchange area west of I-95, and FDOT I-10/I-95 Interchange area east of I-95. Area 3 contains all of the surrounding residential parcels of land. To simplify the risk assessment report, only Area 1 and Area 2 were evaluated in the body of the risk assessment report. All risk assessment tables associated with Areas 1 and 2 are presented in Appendix A of the BHHRA.

It was not feasible for the risk assessment to quantitatively evaluate exposure to surface soil from individual residential properties (Area 3). Therefore, an attempt was made to identify the most highly contaminated samples so that risks and hazards could be estimated for these locations. It was assumed that risks and hazards resulting from exposure to surface soil at these locations would represent the "worst case scenario" for the yards that were sampled during the RI investigation. To this end, the surface soil analytical data were reviewed to determine which locations had the highest numbers, concentrations, and toxicities (potencies) of chemicals. Based on this review, ten sample locations were selected for quantitative evaluation. Area 3 is discussed and evaluated in Appendix B of the BHHRA.

The risk from lead in soil was not included in the cancer risks or hazard calculation in the BHHRA but was determined by the Lead Uptake/Biokinetics Model (IEUBK model).

The conceptual model used in the BHHRA is on Figure 19.

#### 5.2.1.2 5th and Cleveland Incinerator

For purposes of the risk assessment, the 5th & Cleveland Incinerator site was divided into two primary areas. Area 1 consists of the Emmett Reed Community Center area, Emmett Reed Park and the apartment complex located on the west side of Payne Street across from the community center. Area 2 contains all of the surrounding parcels of land (i.e., mainly residential properties). To simplify the risk assessment report, only Area 1 was evaluated in the body of the risk assessment report. All risk assessment tables associated with Area 1 are presented in Appendix A of the BHHRA.

It was not feasible for the risk assessment to quantitatively evaluate exposure to surface soil from individual residential properties (Area 2). Therefore, an attempt was made to identify the most highly contaminated samples so that risks and hazards could be estimated for these locations. It was assumed that risks and hazards resulting from exposure to surface soil at these locations would represent the "worst case scenario" for the yards that were sampled during the RI investigation. To this end, the surface soil analytical data were reviewed to determine which locations had the highest numbers, concentrations, and toxicities (potencies) of chemicals. Based on this review, ten sample locations were selected for quantitative evaluation. Area 2 is discussed and evaluated in Appendix B of the BHHRA.

The risk from lead in soil was not included in the cancer risks or hazard calculation in the BHHRA but was determined by the Lead Uptake/Biokinetics Model (IEUBK model).

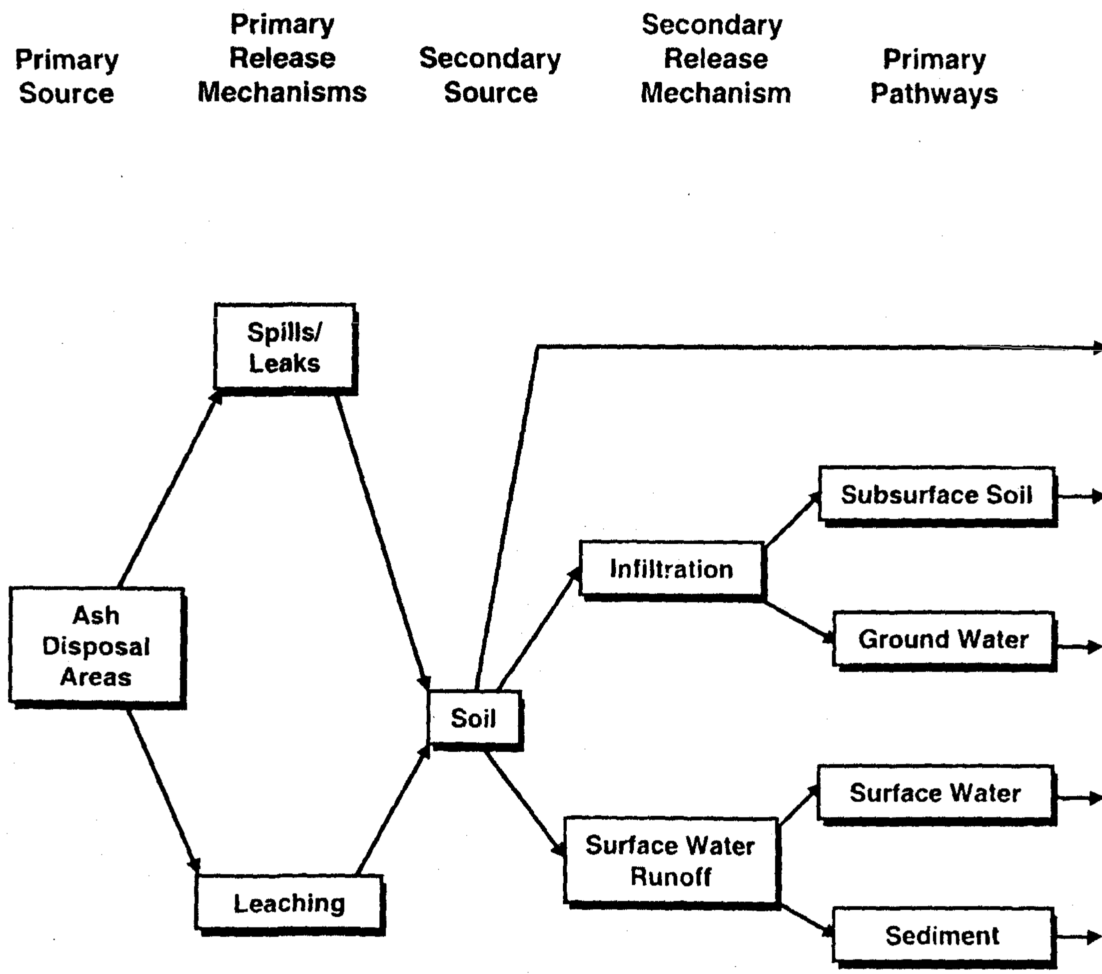
The conceptual model used in the BHHRA is on Figure 20.

#### 5.2.1.3 Lonnie C. Miller, Sr. Park

For purposes of the risk assessment, the site was divided into two areas. The first area is Lonnie C. Miller, Sr. Park. The second area contains all of the surrounding residential parcels of land. To simplify the risk assessment report, the park area is evaluated in the body of the risk assessment report. All risk assessment tables associated with the park are presented in Appendix A of the BHHRA.

It was not feasible for the risk assessment to quantitatively evaluate exposure to surface soil from individual residential properties (Area 2). Therefore, an attempt was made to identify the most highly contaminated samples so that risks and hazards could be estimated for these locations. It was assumed that risks and hazards resulting from exposure to surface soil at these locations

# Figure 3-1
## Human Health Conceptual Site Model
## Jacksonville Ash Site
## Forest Street Incinerator




**POTENTIAL HUMAN RECEPTORS**

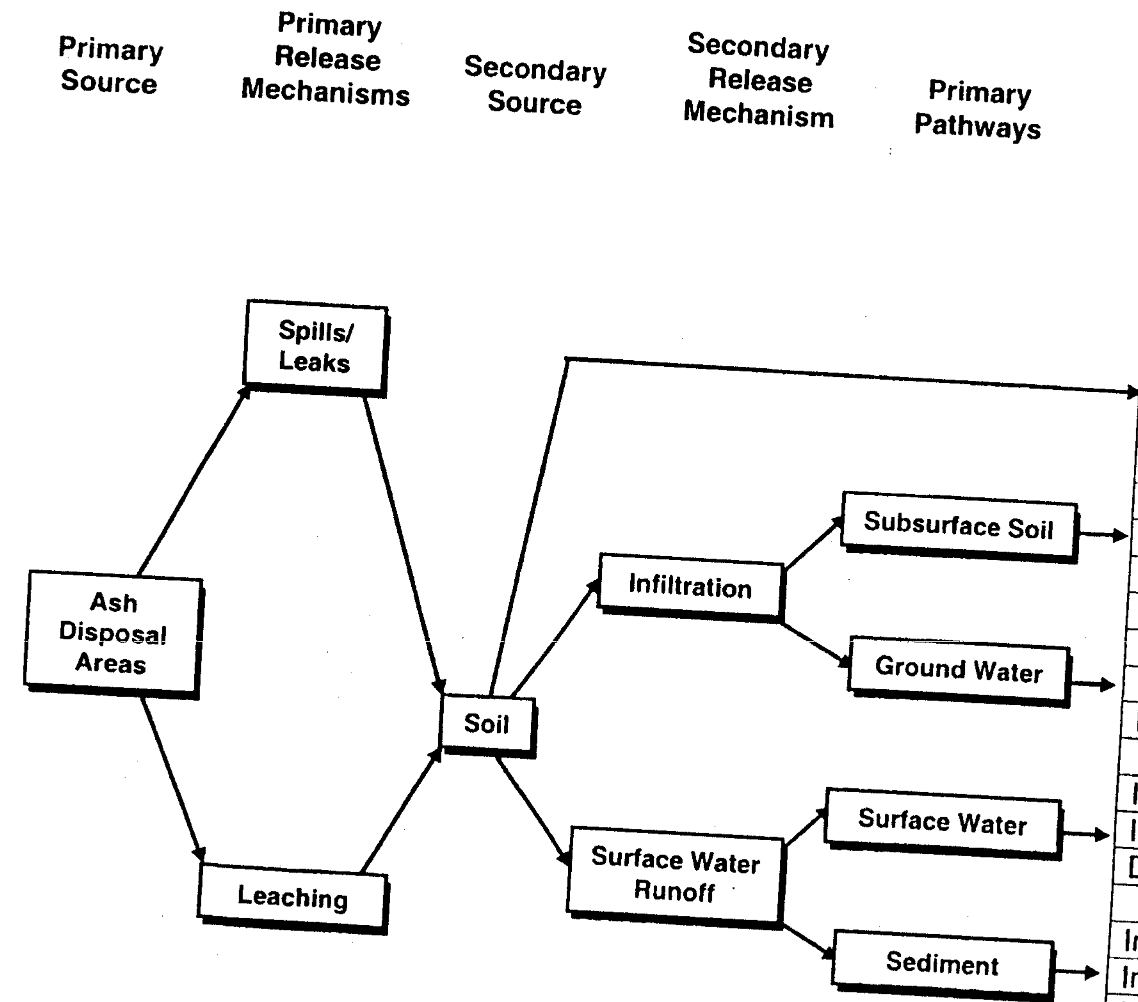
| EXPOSURE ROUTE | CURRENT Onsite Resident | FUTURE Onsite Resident | CURRENT Worker | FUTURE Worker |
|---|---|---|---|---|
| Ingestion | X | X | X | X |
| Inhalation | • | • | • | • |
| Dermal Contact | X | X | X | X |
| | | | | |
| Ingestion | | X | | X |
| Inhalation | | • | | • |
| Dermal Contact | | X | | X |
| | | | | |
| Ingestion | | X | | |
| Inhalation | | • | | |
| Dermal Contact | | • | | |
| | | | | |
| Ingestion | X | X | | |
| Inhalation | | | | |
| Dermal Contact | X | X | | |
| | | | | |
| Ingestion | | | | |
| Inhalation | | | | |
| Dermal Contact | | | | |

X Pathway was quantitatively evaluated
• Pathway was qualitatively evaluated

ROD Figure 19

5 9 0073

# Figure 3-1
## Human Health Conceptual Site Model
## 5th and Cleveland Incinerator (Jacksonville Ash) Site
## Jacksonville, Florida



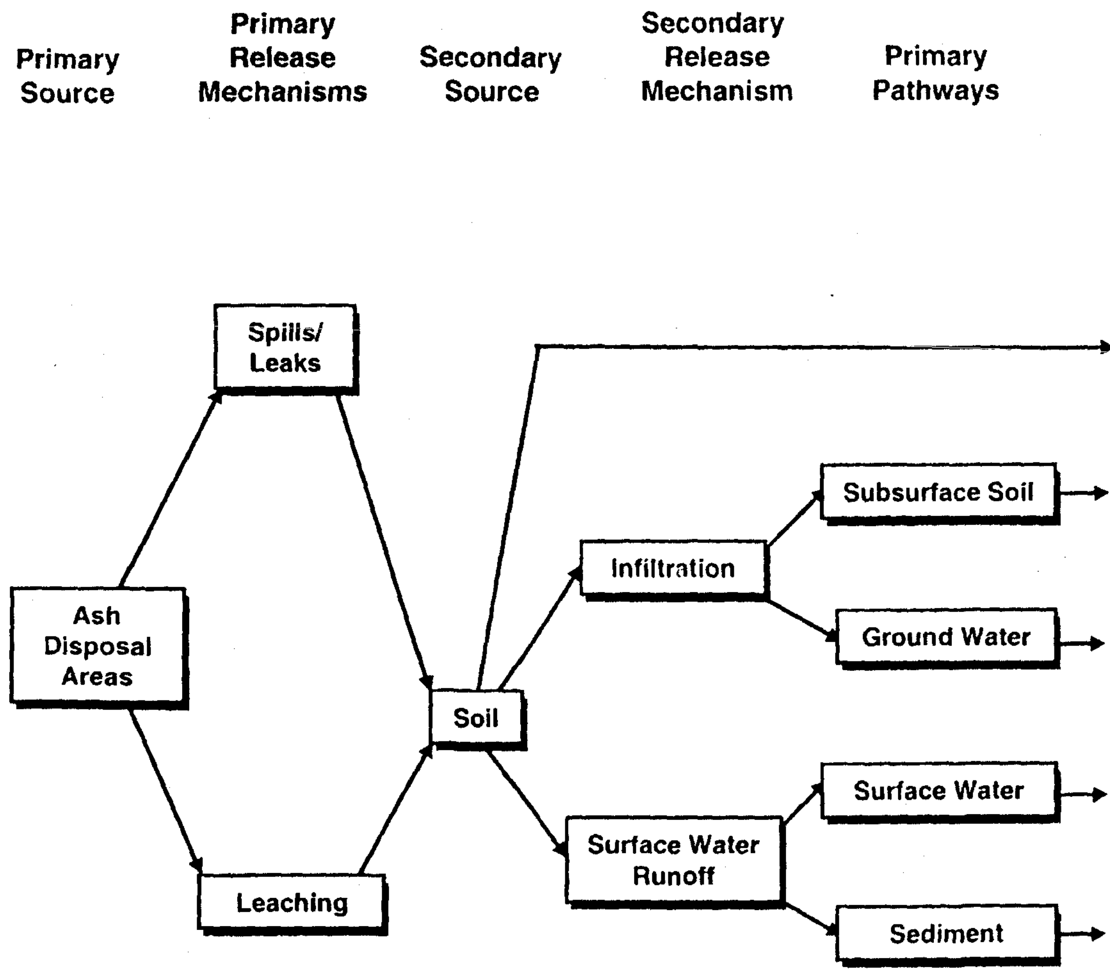

POTENTIAL HUMAN RECEPTORS

| EXPOSURE ROUTE | CURRENT Onsite Resident | FUTURE Onsite Resident |
|---|---|---|
| Ingestion | X | X |
| Inhalation | • | • |
| Dermal Contact | X | X |
| | | |
| Ingestion | X | X |
| Inhalation | • | • |
| Dermal Contact | X | X |
| | | |
| Ingestion | X | X |
| Inhalation | X | X |
| Dermal Contact | X | X |
| | | |
| Ingestion | X | X |
| Inhalation | | |
| Dermal Contact | X | X |
| | | |
| Ingestion | X | X |
| Inhalation | | |
| Dermal Contact | X | X |

X Pathway was quantitatively evaluated
• Pathway was qualitatively evaluated

ROD Figure 20

# Figure 3-1
## Human Health Conceptual Site Model
## Lonnie C. Miller, Sr., Park (Jacksonville Ash) Site
## Jacksonville, Florida




POTENTIAL HUMAN RECEPTORS

| EXPOSURE ROUTE | CURRENT: Onsite Resident | FUTURE: Onsite Resident |
|---|---|---|
| Ingestion | X | X |
| Inhalation | • | • |
| Dermal Contact | X | X |
| | | |
| Ingestion | X | X |
| Inhalation | • | • |
| Dermal Contact | X | X |
| | | |
| Ingestion | X | X |
| Inhalation | X | X |
| Dermal Contact | X | X |
| | | |
| Ingestion | X | X |
| Inhalation | | |
| Dermal Contact | X | X |
| | | |
| Ingestion | X | X |
| Inhalation | | |
| Dermal Contact | X | X |

X Pathway was quantitatively evaluated
• Pathway was qualitatively evaluated

would represent the "worst case scenario" for the yards that were sampled during the RI investigation. To this end, the surface soil analytical data were reviewed to determine which locations had the highest numbers, concentrations, and toxicities (potencies) of chemicals. Based on this review, ten sample locations were selected for quantitative evaluation. The residential areas are discussed and evaluated in Appendix B of the BHHRA.

The risk from lead in soil was not included in the cancer risks or hazard calculation in the BHHRA but was determined by the Lead Uptake/Biokinetics Model (IEUBK model).

The conceptual model used in the BHHRA is on Figure 21.

## 5.3 Exposure Assessment

In order to characterize potential risk, two pieces of information are needed: results from the exposure assessment and chemical-specific toxicity information on the constituents of potential concern (COPCs). Part 5.3 of the ROD summarizes the exposure assessment for the Jacksonville Ash Site including exposure pathways and scenarios quantitatively evaluated in the BHHRA. Part 5.4 of the ROD will address the toxicity assessment. The objective of the exposure assessment is to estimate the types and magnitudes of exposures to COPCs that are present at or migrating from the Site. In short, the purpose of the exposure assessment is to estimate the magnitude of potential human exposure to the COPCs. The BHHRA provides a more detailed analysis on the potential exposures associated with the COPCs at the Site, and why exposure routes were eliminated or retained as routes of potential concern.

The exposure pathways and scenarios evaluated in the BHHRAs for the Forest Street Incinerator and Lonnie C. Miller, Sr. Park sites are in Tables13 and 14.

### 5.3.1 Soil Exposure Assessment

#### 5.3.1.1 Forest Street Incinerator

The risk assessment evaluated 18 surface soil and 13 subsurface soil samples from the Forest Street site (Area 1). Thirteen surface soil samples and one subsurface soil sample were analyzed from the FDOT I-10/I-95 Interchange east of I-95 and five surface soil samples and five subsurface soil samples were analyzed from the FDOT I-10/I-95 Interchange west of I-95. Finally, seven surface soil samples and two subsurface soil samples were analyzed from the industrial area north of McCoy's Creek.

##### 5.3.1.1.1 <u>Current/Future Resident</u>

The risk assessment conservatively assumed that current and future use of the Forest Street site is residential. Therefore, it was assumed that current and future residents may be exposed to COPCs in surface soil. Current and future residents may also be exposed to site-related chemicals in surface water. Also, the future resident was assumed to be exposed to subsurface soil brought to the surface during construction or renovation activities. Potential routes of exposure for residents (child and adult) included incidental ingestion of, and dermal contact with, COPCs in soil.

## TABLE 1
## SELECTION OF EXPOSURE PATHWAYS
## JACKSONVILLE ASH SITE
## FOREST STREET INCINERATOR

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Onsite/ Offsite | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|---|
| Current | Soil | Surface soil | Forest Street Site Proper | Resident | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in surface soil. |
| | | | | | Child | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in surface soil. |
| | | | Industrial Area North of McCoy's Creek | Worker | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Industrial workers may be exposed to contaminants in surface soil. |
| | | | FDOT I-10/I-95 Interchange | Worker | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Industrial workers may be exposed to contaminants in surface soil. |
| | | Air | Forest Street Site Proper | Resident | Adult | Inhalation | Onsite | Qual | Hypothetical adult residents may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | | | | | Child | Inhalation | Onsite | Qual | Hypothetical child residents may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | | | Industrial Area North of McCoy's Creek | Worker | Adult | Inhalation | Onsite | Qual | Industrial workers may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | | | FDOT I-10/I-95 Interchange | Worker | Adult | Inhalation | Onsite | Qual | Industrial workers may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | Surface water | Surface water | McCoy's Creek | Resident | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in McCoy's Creek while using it for recreational purposes. |
| | | | | | Child | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in McCoy's Creek while using it for recreational purposes. |
| Future | Soil | Surface soil | Forest Street Site Proper | Resident | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in surface soil. |
| | | | | | Child | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in surface soil. |
| | | | Industrial Area North of McCoy's Creek | Worker | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Industrial workers may be exposed to contaminants in surface soil. |
| | | | FDOT I-10/I-95 Interchange | Worker | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Industrial workers may be exposed to contaminants in surface soil. |
| | | Subsurface soil | Forest Street Site Proper | Resident | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in subsurface soil brought to the surface during construction activities. |
| | | | | | Child | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in subsurface soil brought to the surface during construction activities. |
| | | | Industrial Area North of McCoy's Creek | Worker | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Industrial workers may be exposed to contaminants in subsurface soil brought to the surface during construction activities. |
| | | | FDOT I-10/I-95 Interchange | Worker | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Industrial workers may be exposed to contaminants in subsurface soil brought to the surface during construction activities. |

**TABLE 1**
**SELECTION OF EXPOSURE PATHWAYS**
**JACKSONVILLE ASH SITE**
**FOREST STREET INCINERATOR**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Onsite/ Offsite | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|---|
| | | Air | Forest Street Site Proper | Resident | Adult | Inhalation | Onsite | Qual | Hypothetical adult residents may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | | | | | Child | Inhalation | Onsite | Qual | Hypothetical child residents may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | | | Industrial Area North of McCoy's Creek | Worker | Adult | Inhalation | Onsite | Qual | Industrial workers may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | | | FDOT I-10/I-95 Interchange | Worker | Adult | Inhalation | Onsite | Qual | Industrial workers may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | Groundwater | Groundwater | Tap Water | Resident | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Qual | Hypothetical residents may install a private well onsite. |
| | | | | | Child | Ingestion<br>Dermal | Onsite | Quant<br>Qual | Hypothetical residents may install a private well onsite. |
| | | Air | Water Vapors at Showerhead | Resident | Adult | Inhalation | Onsite | Qual | Hypothetical residents may install a private well onsite. |
| | | | | | Child | Inhalation | Onsite | Qual | Hypothetical residents may install a private well onsite. |
| | Surface Water | Surface Water | McCoy's Creek | Resident | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in McCoy's Creek while using it for recreational purposes. |
| | | | | | Child | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in McCoy's Creek while using it for recreational purposes. |

ROD Table 13

**TABLE 1**
**SELECTION OF EXPOSURE PATHWAYS**
**JACKSONVILLE ASH SITE**
**LONNIE C. MILLER, SR., PARK**

| Scenario Timeframe | Medium | Exposure Medium | Exposure Point | Receptor Population | Receptor Age | Exposure Route | Onsite/ Offsite | Type of Analysis | Rationale for Selection or Exclusion of Exposure Pathway |
|---|---|---|---|---|---|---|---|---|---|
| Current | Soil | Surface soil/ Sediment | Lonnie C. Miller, Sr., Park | Resident | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in surface soil. |
| | | | | | Child | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in surface soil. |
| | | Air | Lonnie C. Miller, Sr., Park | Resident | Adult | Inhalation | Onsite | Qual | Hypothetical adult residents may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | | | | | Child | Inhalation | Onsite | Qual | Hypothetical child residents may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | Surface water | Surface water | Unnamed Tributary | Resident | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in the unnamed tributary during recreational activities. |
| | | | | | Child | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in the unnamed tributary during recreational activities. |
| Future | Soil | Surface soil/ Sediment | Lonnie C. Miller, Sr., Park | Resident | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in surface soil. |
| | | | | | Child | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in surface soil. |
| | | Subsurface soil | Lonnie C. Miller, Sr., Park | Resident | Adult | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in subsurface soil brought to the surface during construction activities. |
| | | | | | Child | Dermal<br>Ingestion | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in subsurface soil brought to the surface during construction activities. |
| | | Air | Lonnie C. Miller, Sr., Park | Resident | Adult | Inhalation | Onsite | Qual | Hypothetical adult residents may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | | | | | Child | Inhalation | Onsite | Qual | Hypothetical child residents may be exposed to airborne contaminants via inhalation of VOCs or fugitive dust emissions. |
| | Groundwater | Groundwater | Tap Water | Resident | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical residents may install a private well onsite. |
| | | | | | Child | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical residents may install a private well onsite. |
| | | Air | Water Vapors at Showerhead | Resident | Adult | Inhalation | Onsite | Quant | Hypothetical residents may install a private well onsite. |
| | | | | | Child | Inhalation | Onsite | Quant | Hypothetical residents may install a private well onsite. |
| | Surface Water | Surface Water | Unnamed Tributary | Resident | Adult | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical adult residents may be exposed to contaminants in the unnamed tributary during recreational activities. |
| | | | | | Child | Ingestion<br>Dermal | Onsite | Quant<br>Quant | Hypothetical child residents may be exposed to contaminants in the unnamed tributary during recreational activities. |

Individual risk assessments could not be performed on all residential properties in the investigation area, so the ten most contaminated lots were evaluated.

#### 5.3.1.1.2 Current/Future Worker

The risk assessment assumed that residential exposure was limited to Area 1 and the area north of McCoy's Creek in Area 2. It was assumed that the remaining portions of Area 2 (I-10/I-95 Interchange east and west) would not be used for residential use. While working onsite, workers may be exposed to COPCs in soil. Potential routes of exposure for the onsite worker included incidental ingestion of, and dermal contact with, COPCs in surface and subsurface soil.

### 5.3.1.2 5th & Cleveland Incinerator

The human health risk assessment quantitatively evaluates potential risks from exposure to COPCs in surface and subsurface soil, sediment, surface water, and groundwater. The conceptual site model for the 5th & Cleveland Incinerator site incorporates information on the potential chemical sources, affected media, release mechanisms, routes of migration, and known or potential human receptors. The purpose of the conceptual site model is to provide a framework with which to identify potential exposure pathways occurring at the site. Information presented in the SI Report and data collected during a site visit conducted on December 20, 1999, were used to identify potential receptors and exposure pathways at the site.

The risk assessment evaluated 24 surface soil and two subsurface soil samples from Emmett Reed Community Center. Nineteen surface soil samples and 12 subsurface soil samples were analyzed from the Emmett Reed Park. Fifteen surface soil samples and 14 subsurface soil samples were analyzed from the apartment complex.

#### 5.3.1.2.1 Current/Future Resident

A current/future resident may be exposed to COPCs in surface soil as well as subsurface soil that is brought to the surface during construction or renovation activities. Therefore, a current/future resident was quantitatively evaluated for exposure to surface and subsurface soil.

Individual risk assessments could not be performed on all residential properties in the investigation area, so the ten most contaminated lots were evaluated.

### 5.3.1.3 Lonnie C. Miller, Sr. Park

The human health risk assessment quantitatively evaluates potential risks from exposure to COPCs in surface and subsurface soil, sediment, surface water, and groundwater. The conceptual site model for the Lonnie C. Miller, Sr., Park site incorporates information on the potential chemical sources, affected media, release mechanisms, routes of migration, and known or potential human receptors. The purpose of the conceptual site model is to provide a framework with which to identify potential exposure pathways occurring at the site. Information presented in the SI Report and data collected during a site visit conducted on December 20, 1999, were used to identify potential receptors and exposure pathways at the site.

The risk assessment evaluated 53 surface soil and 43 subsurface soil samples from the park. In addition, four sediment samples (LMSW001, LMSW004, LMSW005, and LMSW008) that were collected from the drainage ditch were combined with the surface soil samples. These sediment samples were evaluated as surface soil since the ditch is sometimes dry.

#### 5.3.1.3.1 Current/Future Resident

A current/future resident may be exposed to COPCs in surface soil as well as subsurface soil that is brought to the surface during construction or renovation activities. Therefore, a current/future resident was quantitatively evaluated for exposure to surface (including the four sediment samples) and subsurface soil. The risk assessment conservatively assumed that current and future use of the park is residential. Therefore, it was assumed that current and future residents may be exposed to COPCs in surface soil/sediment. Also, the future resident was assumed to be exposed to subsurface soil brought to the surface during construction or renovation activities. Potential routes of exposure for residents (child and adult) included incidental ingestion of, and dermal contact with, COPCs in soil.

Individual risk assessments could not be performed on all residential properties in the investigation, area so the ten most contaminated lots were evaluated.

### 5.3.2 Groundwater

#### 5.3.2.1 Forest Street Incinerator

The majority of residents located within a 4-mile radius of the site obtain drinking water from the City of Jacksonville municipal water supply system, which is derived from wells that are completed in the Floridan aquifer system. Due to its considerable thickness, low permeability, and high potentiometric surface elevation, generally no recharge of the Floridan aquifer system takes place in the Jacksonville area. The Floridan Aquifer is not affected by site contamination.

A total of 19 groundwater samples were evaluated in the risk assessment. Most residents in the area currently obtain potable water from the municipal water supply; however a future residents may be exposed to groundwater if a private well is installed. Therefore, exposure to groundwater was evaluated for the future resident.

When evaluating exposure to groundwater, EPA Region 4 considers ingestion, and inhalation of and dermal contact with VOCs while showering to be the most significant exposure routes. However, no VOCs were detected in groundwater at the site; therefore, the risk assessment assumed that ingestion of groundwater represented the most significant exposure route for this medium.

#### 5.3.2.2 5th & Cleveland Incinerator

The majority of residents located within a 4-mile radius of the site obtain drinking water from the City of Jacksonville municipal water supply system, which is derived from wells that are completed in the Floridan aquifer system. The municipal water system supplies approximately 385,480 people within the targeted area. A number of small community water systems is also located within 4 miles of the site, including the Jacksonville Suburban Utilities, Magnolia Gardens, and Lake Forest wells. These wells obtain water potable water from the Floridan aquifer system, and are located between 3 and 4 miles northwest and north of the site. These water systems collectively provide potable water to approximately 5,200 people. The Floridan Aquifer system is not affected by the site.

A total of five groundwater samples were evaluated in the risk assessment. Most residents in the area currently obtain potable water from the municipal water supply; however, a resident may install a private well in one of the exposure units in the future. Therefore, exposure to groundwater was evaluated for the future resident.

When evaluating exposure to groundwater, EPA Region 4 considers ingestion, and inhalation of and dermal contact with VOCs while showering to be the most significant exposure routes. However, no VOCs were detected in groundwater at the site; therefore, the risk assessment assumed that ingestion of groundwater represented the most significant exposure route for this medium.

### 5.3.2.3 Lonnie C. Miller, Sr. Park

Most residents within a 4-mile radius of the site obtain drinking water from the City of Jacksonville municipal water supply system, which is derived from wells that are completed in the Floridan aquifer system. The municipal water system supplies approximately 102,755 people within the targeted area. A number of small community water systems is also located within 4 miles of the site, including the Jacksonville Suburban Utilities, Magnolia Gardens, and Lake Forest wells. These wells obtain water potable water from the Floridan aquifer system, and are located between 1.25 and 2.75 miles southeast of the site. These water systems collectively provide potable water to approximately 5,200 people. The Floridan Aquifer system is not affected by the site.

A total of six groundwater samples were evaluated in the risk assessment. Most residents in the area currently obtain potable water from the municipal water supply; however, the risk assessment assumed that a resident may install a private well at the park in the future. Therefore, exposure to groundwater was evaluated for the Current/future resident.

When evaluating exposure to groundwater, EPA Region 4 considers ingestion, and inhalation of and dermal contact with VOCs while showering to be the most significant exposure routes. However, no VOCs were detected in groundwater at the site; therefore, the risk assessment assumed that ingestion of groundwater represented the most significant exposure route for this medium.

### 5.3.3 Surface Water

#### 5.3.3.1 Forest Street Incinerator

Surface drainage at the site generally flows northward overland in drainage ways along streets, in storm water collection systems, and swales to McCoy's Creek located approximately 100 to 150 feet north of the site. McCoy's Creek is a tributary of the St. Johns River, located approximately 1 mile east of the site. Eight surface water samples collected from McCoy's Creek were evaluated in the risk assessment. Current/future residents may be exposed to COPCs in surface water while recreating in the creek.

#### 5.3.3.2 5th & Cleveland Incinerator

Surface drainage in at the site generally flows northeast to a channelized subsurface unnamed creek. The unnamed creek flows to the east of the site and discharges into Hogan Creek about 0.5 mile downstream, which subsequently discharges into the St. Johns River. Ten surface water samples collected from the unnamed creek were evaluated in the risk assessment. Current/future residents may be exposed to COPCs in surface water while recreating in the creek.

#### 5.3.3.3 Lonnie C. Miller, Sr. Park

Surface drainage at the park generally flows toward a drainage ditch that is located on the eastern portion of the site. This ditch is the topographic divide between the western and eastern portions of the site. The ditch conveys water to the northeast to a small tributary of the Ribault River. The tributary flows south and discharges into the Ribault River approximately 0.25 mile downstream of the site. Eleven surface water samples collected from the unnamed tributary were evaluated in the human health risk assessment. Current/future residents may be exposed to COPCs in surface water during recreational activities.

### 5.3.4 Vegetables

The BHHRA also considered that some residents may be exposed to site-related COPCs via ingestion of homegrown vegetables. According to residents, the primary vegetables grown in this area are collard greens, tomatoes, and onions.

## 5.4 Toxicity Assessment

In order to characterize potential risk, two pieces of information are needed: results from the exposure assessment and chemical-specific toxicity information on the COPCs. Part 5.3 summarized the exposure assessment for Jacksonville Ash Site. This part addresses the toxicity assessment.

The purpose of the toxicity assessment is to assign toxicity values (criteria) to each chemical evaluated in the risk assessment. The BHHRA utilized information from the Integrated Risk Information System (IRIS), Health Effects Assessment Summary Tables (HEAST) and National Center for Environmental Assessment (NCEA). In evaluating potential health risks, both carcinogenic and noncarcinogenic health effects were considered.

### 5.4.1 Carcinogenic Health Effects

The potential for producing carcinogenic effects is limited to substances that have been shown to be carcinogenic in animals and/or humans. Excessive exposure to all substances, carcinogens and noncarcinogens, can produce adverse noncarcinogenic effects. Therefore, it was necessary to identify reference doses for every chemical selected regardless of its classification, and to identify carcinogenic slope factors (CSFs) for those that are classified as carcinogenic. Tables 15, 16, 17, 18, 19 and 20 provide carcinogenic risk information which is relevant to the COPCs in both soil and ground water.

### 5.4.2 Non-Carcinogenic Health Effects

Table 21, 22, 23, 24, 25 and 26 provide non-carcinogenic risk information which is relevant to the COPCs in both soil and ground water.

### 5.5 Risk Characterization

The objective of the risk characterization is to integrate the exposure and toxicity assessments into quantitative and qualitative expressions of risk. The risk characterization is an evaluation of the nature and degree of potential carcinogenic and noncarcinogenic health risks posed to current and future receptors at the Jacksonville Ash Site.

### 5.5.1 Evaluation of the Risk for Lead

Although there is a great deal of information on its health effects, there is not an EPA SF or RfD dose for lead. It appears that some health effects, particularly changes in the levels of certain blood enzymes and in aspects of children's neurobehavioral development, may occur at blood lead levels so low as to be essentially without a threshold. Therefore, EPA considers it inappropriate to develop an RfD for inorganic lead (EPA, 2001). Quantifying lead's cancer risk involves many uncertainties, some of which may be unique to lead. Age, health, nutritional state, body burden, and exposure duration influence the absorption, release, and excretion of lead. In addition, current knowledge of lead pharmacokinetics indicates that an estimate derived by standard procedures would not truly describe the potential risk. Thus, EPA's Carcinogen Assessment Group recommends that a numerical estimate not be used (EPA, 2001).

In the absence of lead health criteria, two approaches were used to assess risks associated with exposure to lead at the Site. The first was to predict mean lead blood levels in children using the Lead Uptake/Biokinetics Model (Version 0.99d). The second approach was to compare the maximum detected concentrations of lead in the environmental media at the site to available ARARs or OSWER directives (e.g., federal action levels for drinking water, residential cleanup levels in soil).

Blood levels of lead in the age group ranging from 0 to 7 years of age can be predicted with the Lead Uptake/Biokinetics Model. EPA Region 4 recommended its use to provide an estimation of chronic blood lead concentrations in children based, as much as possible, on site-specific data. Such data can assist in the risk management decision regarding cleanup of lead at hazardous waste sites. The lead model was used to evaluate lead risks in the exposure units evaluated in the

# TABLE 6.1
## CANCER TOXICITY DATA -- ORAL/DERMAL
## JACKSONVILLE ASH SITES
## FOREST STREET INCINERATOR

| Chemical of Potential Concern | Oral Cancer Slope Factor | Oral to Dermal Adjustment Factor | Adjusted Dermal Cancer Slope Factor (1) | Units | Weight of Evidence/ Cancer Guideline Description | Source Target Organ | Date (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|
| Alpha-Chlordane | 3.5E-001 | 50% | 7.0E-001 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |
| Benzo(a)Anthracene | 7.3E-001 | 58% | 1.2E+000 | (mg/kg-day)-1 | B2 | NCEA | 03/21/2001 |
| Benzo(a)pyrene | 7.3E+00 | 58% | 1.26E+001 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |
| Benzo(b)Fluoranthene | 7.3E-001 | 58% | 1.2E+000 | (mg/kg-day)-1 | B2 | NCEA | 03/21/2001 |
| Benzo(g,h,i)Perylene | N/A | N/A | N/A | N/A | D | IRIS | 03/21/2001 |
| Benzo(k)Fluoranthene | 7.3E-002 | 58% | 1.2E+001 | (mg/kg-day)-1 | B2 | NCEA | 03/21/2001 |
| Beryllium | N/A | N/A | N/A | N/A | B1 | IRIS | 03/21/2001 |
| Cadmium | N/A | N/A | N/A | N/A | B1 | IRIS | 03/21/2001 |
| Chromium VI | N/A | N/A | N/A | N/A | A | IRIS | 03/21/2001 |
| Chrysene | 7.3E+003 | 58% | 1.2E-002 | (mg/kg-day)-1 | B2 | NCEA | 03/21/2001 |
| Dieldrin | 1.6E+01 | 50% | 3.2E+01 | (mg/kg-day)-1 | B2 | IRIS | 07/1997 |
| Lindane | 1.3E+000 | 50% | 2.6E+001 | (mg/kg-day)-1 | A | HEAST | 03/21/2001 |
| Arsenic | 1.5E+00 | 95% | 1.6E+00 | (mg/kg-day)-1 | A | IRIS | 03/21/2001 |
| Beta BHC | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| bis (2-Ethylhexyl)Phthalate | 1.4E-02 | 55% | 2.55E-02 | (mg/kg-day)-1 | N/A | N/A | 03/21/2001 |
| Carbazole | 2E-02 | 50% | 4E-02 | (mg/kg-day)-1 | B2 | HEAST | 03/21/2001 |
| Indeno(1,2,3-c,d)Pyrene | 7.3E-001 | 58% | 1.2E+000 | (mg/kg-day)-1 | B2 | NCEA | 03/21/2001 |
| Dibenz(a,h)Anthracene | 7.3E+000 | 58% | 1.26E+001 | (mg/kg-day)-1 | B2 | NCEA | 03/21/2001 |
| Lead | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| p,p' - DDD | 2.4E-001 | 50% | 4.8E-001 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |
| p,p' - DDE | 3.4E-001 | 50% | 6.8E-001 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |
| p,p' - DDT | 3.4E-001 | 50% | 6.8E-001 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |
| TEQ of 2,3,7,8 - TCDD | 1.5E+005 | 50% | 3.0E+005 | (mg/kg-day)-1 | B2 | HEAST | 03/21/2001 |
| PCB-1260 (Aroclor 1260) | 2.0E+00 | 50% | 4E+00 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |

ROD Table 15

N/A = Not Available

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA= National Center for Environmental Assessment

EPA Group:
- A - Human carcinogen
- B1 - Probable human carcinogen - indicates that limited human data are available
- B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
- C - Possible human carcinogen
- D - Not classifiable as a human carcinogen
- E - Evidence of noncarcinogenicity

Weight of Evidence:
- Known/Likely
- Cannot be Determined
- Not Likely

(1) Explanation of derivation provided in Section 4.2.2.3
(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
NCEA values obtained from Region III RBC Table, dated 04/13/00

# TABLE 6.2
## CANCER TOXICITY DATA -- INHALATION
## JACKSONVILLE ASH SITES
## FOREST STREET INCINERATOR

| Chemical of Potential Concern | Unit Risk | Units | Adjustment (1) | Inhalation Cancer Slope Factor | Units | Weight of Evidence/ Cancer Guideline Description | Source | Date (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|
| Alpha-Chlordane | N/A | N/A | N/A | 3.5E-001 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |
| Benzo(a)Anthracene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| Benzo(a)pyrene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| Benzo(b)Fluoranthene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| Benzo(g,h,i)Perylene | N/A | N/A | N/A | N/A | N/A | D | IRIS | 03/21/2001 |
| Benzo(k)Fluoranthene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| Beryllium | 2.4E-03 | (ug/m3)-1 | 3,500 | 8.4E+00 | (mg/kg-day)-1 | B1 | IRIS | 03/21/2001 |
| Cadmium | 1.8E-03 | (ug/m3)-1 | 3,500 | 6.3E+00 | (mg/kg-day)-1 | B1 | IRIS | 03/21/2001 |
| Chromium VI | 1.2E-02 | (ug/m3)-1 | 3,500 | 4.2E+01 | (mg/kg-day)-1 | A | IRIS | 03/21/2001 |
| Cobalt | 4.2E-003 | (ug/m3)-1 | 3,500 | 9.8E+000 | (mg/kg-day)-1 | A | NCEA | 03/21/2001 |
| Dieldrin | 4.6E-03 | (ug/m3)-1 | 3,500 | 1.6E+01 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |
| Arsenic | 4.3E-03 | (ug/m3)-1 | 3,500 | 1.5E+01 | (mg/kg-day)-1 | A | IRIS | 03/21/2001 |
| Carbazole | 5.7E-07 | (ug/m3)-1 | 3,500 | 2.0E-03 | (mg/kg-day)-1 | B2 | HEAST | 03/21/2001 |
| Beta BHC | 5.3E-004 | (ug/m3)-1 | 3,500 | 1.9E+00 | (mg/kg-day)-1 | C | IRIS | 03/21/2001 |
| bis (2-Ethylhexyl)Phthalate | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Indeno(1,2,3-c,d)Pyrene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| Dibenz(a,h)Anthracene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| Lead | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| p,p'-DDD | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| p,p'-DDE | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| p,p'-DDT | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 03/21/2001 |
| TEQ of 2,3,7,8 - TCDD | 3.3E-011 | (ug/m3)-1 | 3,500 | 1.2E-07 | (mg/kg-day)-1 | B2 | HEAST | 03/21/2001 |
| PCB-1260 (Aroclor 1260) | 1.0E-004 | (ug/m3)-1 | 3,500 | 3.5E-001 | (mg/kg-day)-1 | B2 | IRIS | 03/21/2001 |

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA= National Center for Environmental Assessment

ROD Table 16

(1) Explanation of derivation provided in section 4.2.2.2.
(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.

EPA Group:
- A - Human carcinogen
- B1 - Probable human carcinogen - indicates that limited human data are available
- B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
- C - Possible human carcinogen
- D - Not classifiable as a human carcinogen
- E - Evidence of noncarcinogenicity

Weight of Evidence:
- Known/Likely
- Cannot be Determined
- Not Likely

**TABLE 6.1**
**CANCER TOXICITY DATA -- ORAL/DERMAL**
**JACKSONVILLE ASH SITES**
**5TH & CLEVELAND**

| Chemical of Potential Concern | Oral Cancer Slope Factor | Oral to Dermal Adjustment Factor | Adjusted Dermal Cancer Slope Factor (1) | Units | Weight of Evidence/ Cancer Guideline Description | Source Target Organ | Date (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|
| Chloroform | 6.1E-03 | 80% | 7.6E-03 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Benzo(a)pyrene | 7.3E+00 | 58% | 1.26E+01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Aldrin | 1.7E+01 | 50% | 3.4E+01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Dieldrin | 1.6E+01 | 50% | 3.2E+01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Arsenic | 1.5E+00 | 95% | 1.6E+00 | (mg/kg-day)-1 | A | IRIS | 26-Nov-00 |
| Beryllium | N/A | N/A | N/A | N/A | B1 | IRIS | 26-Nov-00 |
| Cadmium | N/A | N/A | N/A | N/A | B1 | IRIS | 26-Nov-00 |
| Chromium VI | N/A | N/A | N/A | N/A | A | IRIS | 26-Nov-00 |
| 1,1-Dichloroethene | 6.0E-01 | 80% | 7.5E+01 | (mg/kg-day)-1 | C | IRIS | 26-Nov-00 |
| 1,2-Dibromo-3-chloropropanol | 1.4E+00 | 80% | 1.75E+00 | (mg/kg-day)-1 | B2 | HEAST | 1-Jul-01 |
| 1,4-Dichlorobenzene | 2.4E-02 | 80% | 3.0E-02 | (mg/kg-day)-1 | C | IRIS | 26-Nov-00 |
| Alpha BHC | 6.3E+00 | 50% | 1.2E+01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Benzene | 1.5E-02 to 5.5E-02 | 97% | 1.5E-02 to 5.5E-02 | (mg/kg-day)-1 | A | IRIS | 26-Nov-00 |
| Beta BHC | 1.8E+00 | 91% | 2.0E+00 | (mg/kg-day)-1 | C | IRIS | 26-Nov-00 |
| bis (2-Ethylhexyl)Phthalate | 1.4E-02 | 55% | 2.5E-02 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Carbazole | 2E-02 | 50% | 4E-02 | (mg/kg-day)-1 | B2 | HEAST | 1-Jul-97 |
| Chloroform | 6.1E-03 | 80% | 7.6E-03 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Chloromethane | 1.3E-02 | 100% | 1.3E-02 | (mg/kg-day)-1 | C | HEAST | 1-Jul-97 |
| Gamma BHC (Lindane) | 1.3E+00 | 50% | 2.6E+00 | (mg/kg-day)-1 | B2/C | HEAST | 1-Jul-97 |
| Chlordane | 3.5E-01 | 50% | 7.0E+01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Heptachlor | 4.5E+00 | 50% | 9.0E+00 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Heptachlor Epoxide | 9.1E+00 | 50% | 1.82E+01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Lead | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Methylene Chloride | 7.5E-03 | 80% | 9.4E-03 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| p,p' - DDD | 2.4E-01 | 50% | 4.8E-01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| p,p' - DDE | 3.4E-01 | 50% | 6.8E-01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| p,p' - DDT | 3.4E-01 | 50% | 6.8E-01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| PCB - 1016 (Aroclor 1016) | 7E-02 | 50% | 1.4E-01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| PCB - 1242 (Aroclor 1242) | 2.0E+00 | 50% | 4.0E+00 | (mg/kg-day)-1 | B2 | IRIS | 21-Feb-01 |
| Pentachlorophenol | 1.2E-01 | 50% | 2.4E-01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| TEQ of 2,3,7,8 - TCDD | 1.5E+05 | 50% | 3.0E+05 | (mg/kg-day)-1 | B2 | HEAST | 1-Jul-97 |
| Trichloroethylene (TCE) | 1.1E-02 | 100% | 1.1E-02 | (mg/kg-day)-1 | B2 | NCEA | 13-Apr-00 |
| PCB-1260 (Aroclor 1260) | 2.0E+00 | 50% | 4E+00 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |

N/A = Not Available

IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment

(1) Explanation of derivation provided in text.
(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
NCEA values obtained from Region III RBC Table, dated 04/13/00

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity

Weight of Evidence
Known/Likely
Cannot be Determined
Not Likely

ROD Table 17

5 9 0087



# TABLE 6.2
## CANCER TOXICITY DATA -- INHALATION
## JACKSONVILLE ASH SITES
## 5TH & CLEVELAND

| Chemical of Potential Concern | Unit Risk | Units | Adjustment (1) | Inhalation Cancer Slope Factor | Units | Weight of Evidence/ Cancer Guideline Description | Source | Date (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|
| Aldrin | 4.9E-03 | (ug/m3)-1 | 3,500 | 1.7E+01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Chloroform | 2.3E-05 | (ug/m3)-1 | 3,500 | 8.1E-02 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Benzo(a)pyrene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 26-Nov-00 |
| Dieldrin | 4.6E-03 | (ug/m3)-1 | 3,500 | 1.6E+01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Arsenic | 4.3E-03 | (ug/m3)-1 | 3,500 | 1.5E+01 | (mg/kg-day)-1 | A | IRIS | 26-Nov-00 |
| Beryllium | 2.4E-03 | (ug/m3)-1 | 3,500 | 8.4E+00 | (mg/kg-day)-1 | B1 | IRIS | 26-Nov-00 |
| Cadmium | 1.8E-03 | (ug/m3)-1 | 3,500 | 6.3E+00 | (mg/kg-day)-1 | B1 | IRIS | 26-Nov-00 |
| Chromium VI | 1.2E-02 | (ug/m3)-1 | 3,500 | 4.2E+01 | (mg/kg-day)-1 | A | IRIS/HEAST | 26-Nov-00 |
| 1,1-Dichloroethene | 5.0E-05 | (ug/m3)-1 | 3,500 | 1.8E-001 | (mg/kg-day)-1 | C | IRIS | 26-Nov-00 |
| 1,4-Dichlorobenzene | N/A | N/A | N/A | N/A | N/A | C | HEAST | 1-Jul-97 |
| Alpha BHC | 1.8E-03 | (ug/m3)-1 | 3,500 | 6.3E+00 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Benzene | 2.2E-06 to 7.8E-06 | (ug/m3)-1 | 3,500 | 7.7E-03 to 2.7E-02 | (mg/kg-day)-1 | A | IRIS | 26-Nov-00 |
| Carbazole | 5.7E-07 | (ug/m3)-1 | 3,500 | 2.0E-03 | (mg/kg-day)-1 | B2 | HEAST | 1-Jul-97 |
| Benzo(a)anthracene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 26-Nov-00 |
| Beta BHC | 5.3E-04 | (ug/m3)-1 | 3,500 | 1.9E+00 | (mg/kg-day)-1 | C | IRIS | 26-Nov-00 |
| Chloromethane | 1.8E-06 | (ug/m3)-1 | 3,500 | 6.3E-03 | (mg/kg-day)-1 | C | HEAST | 1-Jul-97 |
| Chloroform | 2.3E-05 | (ug/m3)-1 | 3,500 | 8.1E-02 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Chlordane | 1.0E-04 | (ug/m3)-1 | 3,500 | 3.5E-01 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Heptachlor | 1.3E-03 | (ug/m3)-1 | 3,500 | 4.6E+00 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Heptachlor Epoxide | 2.6E-03 | (ug/m3)-1 | 3,500 | 9.1E+00 | (mg/kg-day)-1 | B2 | IRIS | 26-Nov-00 |
| Lead | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 26-Nov-00 |
| p,p'-DDD | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 26-Nov-00 |
| p,p'-DDE | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 26-Nov-00 |
| p,p'-DDT | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 26-Nov-00 |
| Pentachlorophenol | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 26-Nov-00 |
| TEQ of 2,3,7,8 - TCDD | 3.3E-11 | (ug/m3)-1 | 3,500 | 1.2E-07 | (mg/kg-day)-1 | B2 | HEAST | 1-Jul-97 |

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA= National Center for Environmental Assessment

(1) Explanation of derivation provided in Section 4.2.2.2 of the text.
(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.

EPA Group
- A - Human carcinogen
- B1 - Probable human carcinogen - indicates that limited human data are available
- B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
- C - Possible human carcinogen
- D - Not classifiable as a human carcinogen
- E - Evidence of noncarcinogenicity

Weight of Evidence
- Known/Likely
- Cannot be Determined
- Not Likely

ROD Table 18

# TABLE 6.1
## CANCER TOXICITY DATA -- ORAL/DERMAL
## JACKSONVILLE ASH SITES
## LONNIE C. MILLER

| Chemical of Potential Concern | Oral Cancer Slope Factor | Oral to Dermal Adjustment Factor | Adjusted Dermal Cancer Slope Factor (1) | Units | Weight of Evidence/ Cancer Guideline Description | Source Target Organ | Date (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|
| Alpha-Chlordane | 3.5E-01 | 50% | 7.0E-001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| Benzo(a)Anthracene | 7.3E-01 | 58% | 1.2E+000 | (mg/kg-day)-1 | B2 | NCEA | 05/01 |
| Benzo(a)pyrene | 7.3E+00 | 58% | 1.26E+001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| Benzo(b)Fluoranthene | 7.3E-01 | 58% | 1.2E+000 | (mg/kg-day)-1 | B2 | NCEA | 05/01 |
| Benzo(g,h,i)Perylene | N/A | N/A | N/A | N/A | D | IRIS | 05/01 |
| Benzo(k)Fluoranthene | 7.3E-02 | 58% | 1.2E-001 | (mg/kg-day)-1 | B2 | NCEA | 05/01 |
| Beryllium | N/A | N/A | N/A | N/A | B1 | IRIS | 05/01 |
| Cadmium | N/A | N/A | N/A | N/A | B1 | IRIS | 05/01 |
| Chromium VI | N/A | N/A | N/A | N/A | A | IRIS | 05/01 |
| Chrysene | 7.3E+03 | 58% | 1.2E-002 | (mg/kg-day)-1 | B2 | NCEA | 05/01 |
| Lindane | 1.3E+00 | 50% | 2.6E+001 | (mg/kg-day)-1 | A | HEAST | 07/97 |
| Cobalt | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Dieldrin | 1.6E+01 | 50% | 3.2E+01 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| Arsenic | 1.5E+00 | 95% | 1.6E+00 | (mg/kg-day)-1 | A | IRIS | 05/01 |
| Beta BHC | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| bis (2-Ethylhexyl)Phthalate | 1.4E-02 | 55% | 2.55E-02 | (mg/kg-day)-1 | N/A | N/A | 05/01 |
| Carbazole | 2E-02 | 50% | 4E-02 | (mg/kg-day)-1 | B2 | HEAST | 07/97 |
| Indeno(1,2,3-c,d)Pyrene | 7.3E-01 | 58% | 1.2E+000 | (mg/kg-day)-1 | B2 | NCEA | 05/01 |
| Dibenz(a,h)Anthracene | 7.3E+00 | 58% | 1.26E+001 | (mg/kg-day)-1 | B2 | NCEA | 05/01 |
| Lead | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| 3-Methylphenol (m-cresol) | NA | NA | NA | NA | C | IRIS | 05/01 |
| 4-Methylphenol (p-cresol) | NA | NA | NA | NA | C | HEAST | 07/97 |
| p,p' - DDD | 2.4E-001 | 50% | 4.8E-001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| p,p' - DDE | 3.4E-001 | 50% | 6.8E-001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| p,p' - DDT | 3.4E-001 | 50% | 6.8E-001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| TEQ of 2,3,7,8 - TCDD | 1.5E+005 | 50% | 3.0E+005 | (mg/kg-day)-1 | B2 | HEAST | 07/97 |
| PCB-1248 (Aroclor 1248) | 2.0E+00 | 50% | 4E+00 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| PCB-1254 (Aroclor 1254) | 2.0E+00 | 50% | 4E+00 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| PCB-1260 (Aroclor 1260) | 2.0E+00 | 50% | 4E+00 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| Vinyl Chloride | 1.4E+00 | 100% | 1.4E+00 | (mg/kg-day)-2 | A | IRIS | 05/01 |

N/A = Not Available
IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA= National Center for Environmental Assessment

ROD Table 19

(1) Explanation of derivation provided in Section 4 2 2 3.
(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.
NCEA values obtained from Region III RBC Table, dated 04/13/00.

EPA Group:
- A - Human carcinogen
- B1 - Probable human carcinogen - indicates that limited human data are available
- B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
- C - Possible human carcinogen
- D - Not classifiable as a human carcinogen
- E - Evidence of noncarcinogenicity

Weight of Evidence:
- Known/Likely
- Cannot be Determined
- Not Likely

## TABLE 6.2
## CANCER TOXICITY DATA -- INHALATION
## JACKSONVILLE ASH SITES
## LONNIE C. MILLER

| Chemical of Potential Concern | Unit Risk | Units | Adjustment (1) | Inhalation Cancer Slope Factor | Units | Weight of Evidence/ Cancer Guideline Description | Source | Date (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|
| Alpha-Chlordane | N/A | N/A | N/A | 3.5E-001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| Benzo(a)Anthracene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| Benzo(a)pyrene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| Benzo(b)Fluoranthene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| Benzo(g,h,i)Perylene | N/A | N/A | N/A | N/A | N/A | D | IRIS | 05/01 |
| Benzo(k)Fluoranthene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| Beryllium | 2.4E-03 | (ug/m3)-1 | 3,500 | 8.4E+00 | (mg/kg-day)-1 | B1 | IRIS | 05/01 |
| Cadmium | 1.8E-03 | (ug/m3)-1 | 3,500 | 6.3E+00 | (mg/kg-day)-1 | B1 | IRIS | 05/01 |
| Chromium VI | 1.2E-02 | (ug/m3)-1 | 3,500 | 4.2E+01 | (mg/kg-day)-1 | A | IRIS | 05/01 |
| Cobalt | 4.2E-003 | (ug/m3)-1 | 3,500 | 9.8E+000 | (mg/kg-day)-1 | A | NCEA | 05/01 |
| Dieldrin | 4.6E-03 | (ug/m3)-1 | 3,500 | 1.6E+01 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| Arsenic | 4.3E-03 | (ug/m3)-1 | 3,500 | 1.5E+01 | (mg/kg-day)-1 | A | IRIS | 05/01 |
| Carbazole | 5.7E-07 | (ug/m3)-1 | 3,500 | 2.0E-03 | (mg/kg-day)-1 | B2 | HEAST | 07/97 |
| Beta BHC | 5.3E-004 | (ug/m3)-1 | 3,500 | 1.9E+00 | (mg/kg-day)-1 | C | IRIS | 05/01 |
| bis (2-Ethylhexyl)Phthalate | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Indeno(1,2,3-c,d)Pyrene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| Dibenz(a,h)Anthracene | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| Lead | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| 3-Methylphenol (m-cresol) | NA | NA | NA | NA | NA | C | IRIS | 05/01 |
| 4-Methylphenol (p-cresol) | NA | NA | NA | NA | NA | C | HEAST | 07/97 |
| p,p'-DDD | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| p,p'-DDE | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| p,p'-DDT | N/A | N/A | N/A | N/A | N/A | B2 | IRIS | 05/01 |
| TEQ of 2,3,7,8 - TCDD | 3.3E-011 | (ug/m3)-1 | 3,500 | 1.2E-07 | (mg/kg-day)-1 | B2 | HEAST | 07/97 |
| PCB-1248 (Aroclor 1248) | 1.0E-004 | (ug/m3)-1 | 3,500 | 3.5E-001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| PCB-1254 (Aroclor 1254) | 1.0E-004 | (ug/m3)-1 | 3,500 | 3.5E-001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| PCB-1260 (Aroclor 1260) | 1.0E-004 | (ug/m3)-1 | 3,500 | 3.5E-001 | (mg/kg-day)-1 | B2 | IRIS | 05/01 |
| Vinyl Chloride | 4.4E-06 | (ug/m3)-1 | 3,500 | 1.5E-02 | (mg/kg-day)-1 | A | IRIS | 05/01 |

IRIS = Integrated Risk Information System
HEAST= Health Effects Assessment Summary Tables
NCEA= National Center for Environmental Assessment

ROD Table 20

(1) Explanation of derivation provided in Section 4.2.2.2.
(2) For IRIS values, provide the date IRIS was searched.
For HEAST values, provide the date of HEAST.

EPA Group:
A - Human carcinogen
B1 - Probable human carcinogen - indicates that limited human data are available
B2 - Probable human carcinogen - indicates sufficient evidence in animals and inadequate or no evidence in humans
C - Possible human carcinogen
D - Not classifiable as a human carcinogen
E - Evidence of noncarcinogenicity
Weight of Evidence:
Known/Likely
Cannot be Determined
Not Likely

5 9 0089

**TABLE 5.1**
**NON-CANCER TOXICITY DATA -- ORAL/DERMAL**
**JACKSONVILLE ASH SITES**
**FOREST STREET INCINERATOR**

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Oral to Dermal Adjustment Factor (1) | Adjusted Dermal RfD (2) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates of RfD: Target Organ (3) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | Chronic | 6E-02 | mg/kg-day | 50% | 3.0E-02 | mg/kg-day | Liver | 3000 | IRIS | 03/21/2001 |
| Acenaphthylene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Alpha Chlordane | Chronic | 5E-004 | mg/kg-day | 50% | 2.5E-004 | mg/kg-day | Liver | 300 | | 03/21/2001 |
| Aluminum | Chronic | 1E+00 | mg/kg-day | 10% | 1.0E-01 | mg/kg-day | | | NCEA | 03/21/2001 |
| Anthracene | Chronic | 3E-01 | mg/kg-day | 50% | 1.5E-002 | mg/kg-day | N/A | 3000 | IRIS | 03/21/2001 |
| Antimony | Chronic | 4E-04 | mg/kg-day | 1% | 4.0E-06 | mg/kg-day | Blood | 1000 | IRIS | 03/21/2001 |
| Arsenic | Chronic | 3E-04 | mg/kg-day | 95% | 2.9E-004 | mg/kg-day | Skin | 3 | IRIS | 03/21/2001 |
| Barium | Chronic | 7E-02 | mg/kg-day | 7% | 4.9E-03 | mg/kg-day | Kidney | 3 | IRIS | 03/21/2001 |
| Benzo(a)Anthracene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(a)Pyrene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(b)Fluoranthene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(g,h,i)Perylene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(k)Fluoranthene | Chronic | 1E-002 | mg/kg-day | 80% | 8.0E-03 | mg/kg-day | Liver | 1000 | IRIS | 03/21/2001 |
| Beryllium | Chronic | 2E-03 | mg/kg-day | 20% | 4.0E-004 | mg/kg-day | Small Intestine | 300 | IRIS | 03/21/2001 |
| Beta BHC (Beta Hexachlorocyclohexane) | Chronic | 2E-004 | mg/kg-day | 50% | 1E-004 | mg/kg-day | Liver Tumors | | NCEA | 03/21/2001 |
| bis(2-Ethylhexyl)Phthalate | Chronic | 2E-02 | mg/kg-day | 55% | 1.1E-02 | mg/kg-day | Liver | 1000 | IRIS | 03/21/2001 |
| Cadmium | Chronic | 5E-04 | mg/kg-day | 5% | 2.5E-05 | mg/kg-day | Kidney | 10 | IRIS | 03/21/2001 |
| Calcium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Carbazole | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Chromium Total | Chronic | 3E-03 | mg/kg-day | 2% | 6.0E-05 | mg/kg-day | Skin | 900 | IRIS | 03/21/2001 |
| Chrysene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Cobalt | Chronic | 2E-002 | mg/kg-day | 20% | 4.0E-004 | mg/kg-day | | | NCEA | 03/21/2001 |
| Copper | Chronic | 4E-002 | mg/kg-day | 20% | 8.0E-003 | mg/kg-day | GI Tract | 20 | HEAST | 03/21/2001 |
| Cyanide | Chronic | 2E-02 | mg/kg-day | 20% | 4.0E-003 | mg/kg-day | Whole Body | 500 | IRIS | 03/21/2001 |
| p,p'-DDD | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| p,p'-DDE | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| p,p'-DDT | Chronic | 5E-04 | mg/kg-day | 50% | 2.5E-004 | mg/kg-day | Liver | 100 | IRIS | 03/21/2001 |

ROD Table 21

## TABLE 5.1
## NON-CANCER TOXICITY DATA -- ORAL/DERMAL
## JACKSONVILLE ASH SITES
## FOREST STREET INCINERATOR

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Oral to Dermal Adjustment Factor (1) | Adjusted Dermal RfD (2) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates of RfD: Target Organ (3) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dibenz(a,h)Anthracene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Dibenzofuran | Chronic | 4E-003 | mg/kg-day | 50% | 2E-003 | mg/kg-day | N/A | N/A | NCEA | 03/21/2001 |
| Diethyl Phthalate | Chronic | 8E-001 | mg/kg-day | 50% | 4.0E-001 | mg/kg-day | N/A | 1000 | IRIS | 03/21/2001 |
| Dieldrin | Chronic | 5E-05 | mg/kg-day | 50% | 2.5E-05 | mg/kg-day | Liver | 100 | IRIS | 03/21/2001 |
| Di-n-butylphthalate | Chronic | 1E-001 | mg/kg-day | 50% | 5.0E-002 | mg/kg-day | N/A | 1000 | IRIS | 03/21/2001 |
| Endrin | Chronic | 3E-04 | mg/kg-day | 50% | 1.5E-04 | mg/kg-day | Liver | 100 | IRIS | 03/21/2001 |
| Fluoranthene | Chronic | 4E-02 | mg/kg-day | 50% | 2.0E-02 | mg/kg-day | Liver | 3000 | IRIS | 03/21/2001 |
| Fluorene | Chronic | 4E-02 | mg/kg-day | 58% | 2.3E-02 | mg/kg-day | Deceased Cell Count | 3000 | IRIS | 03/21/2001 |
| gamma BHC (Lindane) | Chronic | 3E-04 | mg/kg-day | 50% | 1.5E-04 | mg/kg-day | Liver/Kidney | 1000 | IRIS | 03/21/2001 |
| Indeno(1,2,3-c,d)Pyrene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Iron | Chronic | 3E-01 | mg/kg-day | 15% | 4.5E-02 | mg/kg-day | | | NCEA | 03/21/2001 |
| Lead | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Magnesium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Manganese (soil) | Chronic | 2E-002 | mg/kg-day | 5% | 4E-003 | mg/kg-day | CNS | 1 | N/A | 03/21/2001 |
| Mercury (elemental) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Naphthalene | Chronic | 2E-02 | mg/kg-day | 50% | 1.0E-02 | mg/kg-day | Body Weight | 3000 | IRIS | 03/21/2001 |
| Nickel | Chronic | 2E-02 | mg/kg-day | 27% | 5.4E-03 | mg/kg-day | Body Weight | 300 | IRIS | 03/21/2001 |
| PCB-1260 (Aroclor 1260) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Phenanthrene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Potassium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Pyrene | Chronic | 3E-02 | mg/kg-day | 87% | 2.6E-002 | mg/kg-day | Kidney | 3000 | IRIS | 03/21/2001 |
| Selenium | Chronic | 5E-03 | mg/kg-day | 20% | 1.0E-003 | mg/kg-day | Whole Body | 3 | IRIS | 03/21/2001 |
| Silver | Chronic | 5E-03 | mg/kg-day | 20% | 1.0E-03 | mg/kg-day | Skin | 3 | IRIS | 03/21/2001 |
| Sodium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| TEQ of 2,3,7,8-TCDD | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 03/21/2001 |
| Thallium | Chronic | 8E-05 | mg/kg-day | 15% | 1.2E-05 | mg/kg-day | NOAEL | 3000 | IRIS | 03/21/2001 |
| Vanadium | Chronic | 7E-03 | mg/kg-day | 20% | 1.4E-03 | mg/kg-day | N/A | 100 | HEAST | 03/21/2001 |
| Zinc | Chronic | 3E-01 | mg/kg-day | 20% | 6.0E-02 | mg/kg-day | Blood | 3 | IRIS | 03/21/2001 |

N/A = Not Applicable
CNS = Central nervous system
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment
Other = Region III Risk-Based Concentration Table
(1) Refer to RAGS, Part A and text for an explanation.
(2) Provide equation used for derivation.
(3) For IRIS values, provided the date IRIS was searched.
For HEAST values, provided the date of HEAST.
NCEA values obtained from Region III RBC Table, dated 04/13/00.

ROD Table 21

5 9 0091

# TABLE 5.2
## NON-CANCER TOXICITY DATA -- INHALATION
## JACKSONVILLE ASH SITES
## FOREST STREET INCINERATOR

| Chemical of Potential Concern | Chronic/ Subchronic | Value Inhalation RfC | Units | Adjusted Inhalation RfD (1) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 03/21/2001 |
| Acenaphthylene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 03/21/2001 |
| Alpha Chlordane | Chronic | 7E-004 | mg/m3 | 2E-004 | mg/kg-day | Hepatic Necrosis | 1000 | IRIS | 03/21/2001 |
| Aluminum | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Anthracene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Antimony | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Arsenic | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Barium | N/A | N/A | N/A | 1.4E-004 | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(a)Anthracene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(a)Pyrene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(b)Fluoranthene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(g,h,i)Perylene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Benzo(k)Fluoranthene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Beryllium | Chronic | 2E-02 | mg/m3 | 5.7E-006 | mg/kg-day | Small Intestine | 300 | IRIS | 03/21/2001 |
| Beta BHC (Beta Hexachlorocycl | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| bis(2-Ethylhexyl)Phthalate | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Cadmium | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Calcium | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Carbazole | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Chromium Total | Chronic | 1E-004 | mg/m3 | 2E-006 | mg/kg-day | | 1 | | 03/21/2001 |
| Chrysene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Cobalt | N/A | | mg/m3 | 6E-006 | mg/kg-day | | | NCEA | 03/21/2001 |
| Copper | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Cyanide | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| p,p'-DDD | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| p,p'-DDE | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| p,p'-DDT | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Dibenz(a,h)Anthracene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Dibenzofuran | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Diethyl Phthalate | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Dieldrin | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Di-n-butylphthalate | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Endrin | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Fluoranthene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Fluorene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| gamma BHC (Lindane) | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Indeno(1,2,3-c,d)Pyrene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Iron | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Lead | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Magnesium | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Manganese (soil) | Chronic | 5E-005 | mg/m3 | 1.4E-005 | mg/kg-day | CNS | 1000 | IRIS | 03/21/2001 |
| Mercury (elemental) | Chronic | 3E-004 | mg/m3 | 8.6E-005 | mg/kg-day | N/A | 30 | IRIS | 03/21/2001 |
| Naphthalene | Chronic | 3E-003 | mg/m3 | 9.0E-004 | mg/kg-day | Body Weight | 3000 | IRIS | 03/21/2001 |
| Nickel | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |

## TABLE 5.2
## NON-CANCER TOXICITY DATA – INHALATION
## JACKSONVILLE ASH SITES
## FOREST STREET INCINERATOR

| Chemical of Potential Concern | Chronic/ Subchronic | Value Inhalation RfC | Units | Adjusted Inhalation RfD (1) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|
| PCB-1260 (Aroclor 1260) | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Phenanthrene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Potassium | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Pyrene | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Selenium | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Silver | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Sodium | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| TEQ of 2,3,7,8-TCDD | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Thallium | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Vanadium | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |
| Zinc | N/A | N/A | N/A | | N/A | N/A | N/A | N/A | 03/21/2001 |

N/A = Not Applicable
CNS = Central nervous system
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment
Other = Region III Risk-Based Concentration Table
(1) Refer to RAGS, Part A and text for an explanation.
(2) Provide equation used for derivation.
(3) For IRIS values, provided the date IRIS was searched.
For HEAST values, provided the date of HEAST.
NCEA values obtained from Region III RBC Table, dated 04/13/00.

ROD Table 22

**TABLE 5.1**
**NON-CANCER TOXICITY DATA -- ORAL/DERMAL**
**JACKSONVILLE ASH SITES**
**5TH & CLEVELAND**

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Oral to Dermal Adjustment Factor (1) | Adjusted Dermal RfD (2) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates of RfD: Target Organ (3) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | Chronic | 6E-02 | mg/kg-day | 50% | 3.0E-02 | mg/kg-day | Liver | 3000 | IRIS | 20-Nov-00 |
| Acenaphthylene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Acetone | Chronic | 1E-01 | mg/kg-day | 83% | 8.3E-02 | mg/kg-day | Liver, Kidney | 1000 | IRIS | 20-Nov-00 |
| Aldrin | Chronic | 3E-05 | mg/kg-day | 50% | 1.5E-05 | mg/kg-day | Liver | 1000 | IRIS | 20-Nov-00 |
| Alpha BHC (Alpha Hexachlorocyclohexane) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Alpha Endosulfan (Endosulfan I) | Chronic | 6E-03 | mg/kg-day | 50% | 3.0E-03 | mg/kg-day | Kidney | 100 | IRIS | 20-Nov-00 |
| Aluminum | Chronic | 1E+00 | mg/kg-day | 10% | 1.0E-01 | mg/kg-day | | | NCEA | 13-Apr-00 |
| Anthracene | Chronic | 3E-01 | mg/kg-day | 50% | 1.5E-02 | mg/kg-day | N/A | 3000 | IRIS | 20-Nov-00 |
| Antimony | Chronic | 4E-04 | mg/kg-day | 1% | 4.0E-06 | mg/kg-day | Blood | 1000 | IRIS | 20-Nov-00 |
| Arsenic | Chronic | 3E-04 | mg/kg-day | 95% | 2.9E-04 | mg/kg-day | Skin | 3 | IRIS | 20-Nov-00 |
| Barium | Chronic | 7E-02 | mg/kg-day | 7% | 4.9E-03 | mg/kg-day | Kidney | 3 | IRIS | 20-Nov-00 |
| Benzene | Chronic | 3E-03 | mg/kg-day | 97% | 3E-03 | mg/kg-day | | | NCEA | 13-Apr-00 |
| Benzo(a)Anthracene | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Benzo(a)Pyrene | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Benzo(b)Fluoranthene | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Benzo(g,h,i)Perylene | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Benzo(k)Fluoranthene | Chronic | 1E-02 | mg/kg-day | 80% | 8.0E-03 | mg/kg-day | Liver | 1000 | IRIS | 20-Nov-00 |
| Benzyl Butyl Phthalate | Chronic | 2E-01 | mg/kg-day | 50% | 1E-01 | mg/kg-day | Liver | 1000 | IRIS | 20-Nov-00 |
| Beryllium | Chronic | 2E-03 | mg/kg-day | 20% | 4.0E-04 | mg/kg-day | Small Intestine | 300 | IRIS | 20-Nov-00 |
| Beta BHC (Beta Hexachlorocyclohexane) | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| bis(2-Ethylhexyl)Phthalate | Chronic | 2E-02 | mg/kg-day | 55% | 1.1E-02 | mg/kg-day | Liver | 1000 | IRIS | 20-Nov-00 |
| Cadmium | Chronic | 5E-04 | mg/kg-day | 5% | 2.5E-05 | mg/kg-day | Kidney | 10 | IRIS | 20-Nov-00 |
| Carbazole | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Carbon Disulfide | Chronic | 1E-01 | mg/kg-day | 80% | 8.0E-02 | mg/kg-day | Fetus | 100 | IRIS | 20-Nov-00 |
| Chlorobenzene | Chronic | 2E-02 | mg/kg-day | 31% | 6.2E-03 | mg/kg-day | Liver | 1000 | IRIS | 20-Nov-00 |
| Chlordane | Chronic | 5.0E-04 | mg/kg-day | 50% | 2.5E-04 | mg/kg-day | N/A | 300 | IRIS | 20-Nov-00 |
| Chloroethane | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Chloroform | Chronic | 1E-02 | mg/kg-day | 80% | 8.0E-03 | mg/kg-day | Liver | 1000 | IRIS | 20-Nov-00 |
| Chloromethane | Chronic | 1.6E+00 | ug/l | 100% | | | Lungs | 1000 | IRIS | 20-Nov-00 |
| Chromium VI | Chronic | 3E-03 | mg/kg-day | 2% | 6.0E-05 | mg/kg-day | Skin | 900 | IRIS | 20-Nov-00 |
| Chrysene | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Cobalt | Chronic | 6E-02 | mg/kg-day | 20% | 1.2E-02 | mg/kg-day | | | NCEA | 13-Apr-00 |
| Copper | Chronic | 4E-02 | mg/kg-day | 20% | 8.0E-03 | mg/kg-day | GI Tract | 20 | HEAST | 1-Jul-97 |
| Cyanide | Chronic | 2E-02 | mg/kg-day | 20% | 4.0E-03 | mg/kg-day | Whole Body | 500 | IRIS | 20-Nov-00 |
| p,p'-DDD | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| p,p'-DDE | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| p,p'-DDT | Chronic | 5E-04 | mg/kg-day | 50% | 2.5E-04 | mg/kg-day | Liver | 100 | IRIS | 20-Nov-00 |

ROD Table 23

## TABLE 5.1
## NON-CANCER TOXICITY DATA -- ORAL/DERMAL
## JACKSONVILLE ASH SITES
## 5TH & CLEVELAND

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Oral to Dermal Adjustment Factor (1) | Adjusted Dermal RfD (2) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates of RfD: Target Organ (3) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|---|
| Dibenz(a,h)Anthracene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Dibenzofuran | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 1,2-Dibromo-3-chloropropanol | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 1,1-Dichloroethene | Chronic | 1E-01 | mg/kg-day | 80% | 8.0E-02 | mg/kg-day | None Observed | 1000 | HEAST | 1-Jul-97 |
| Dieldrin | Chronic | 5E-05 | mg/kg-day | 50% | 2.5E-05 | mg/kg-day | Liver | 100 | IRIS | 20-Nov-00 |
| Di-n-Octylphthalate | Chronic | 2E-02 | mg/kg-day | 50% | 1E-02 | mg/kg-day | Kidney/Liver | 1000 | HEAST | 1-Jul-97 |
| Endrin | Chronic | 3E-04 | mg/kg-day | 50% | 1.5E-04 | mg/kg-day | Liver | 100 | IRIS | 20-Nov-00 |
| Endrin Aldehyde | Chronic | 3E-04 | mg/kg-day | 50% | 1.5E-05 | mg/kg-day | Liver | 100 | IRIS | 20-Nov-00 |
| Ethylbenzene | Chronic | 1E-01 | mg/kg-day | 80% | 8.0E-02 | mg/kg-day | Liver/Kidney | 1000 | IRIS | 20-Nov-00 |
| Fluoranthene | Chronic | 4E-02 | mg/kg-day | 50% | 2.0E-02 | mg/kg-day | Liver | 3000 | IRIS | 20-Nov-00 |
| Fluorene | Chronic | 4E-02 | mg/kg-day | 58% | 2.3E-02 | mg/kg-day | Deceased Cell Count | 3000 | IRIS | 20-Nov-00 |
| gamma BHC (Lindane) | Chronic | 3E-04 | mg/kg-day | 50% | 1.5E-04 | mg/kg-day | Liver/Kidney | 1000 | IRIS | 20-Nov-00 |
| Heptachlor | Chronic | 5E-04 | mg/kg-day | 50% | 2.5E-04 | mg/kg-day | Liver | 300 | IRIS | 20-Nov-00 |
| Heptachlor Epoxide | Chronic | 1.3E-05 | mg/kg-day | 50% | 6.5E-06 | mg/kg-day | Liver | 1000 | IRIS | 20-Nov-00 |
| Indeno(1,2,3-c,d)Pyrene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Iron | Chronic | 3E-01 | mg/kg-day | 15% | 4.5E-02 | mg/kg-day | | | NCEA | 13-Apr-00 |
| Isopropylbenzene (Cumene) | Subchronic | 4E-01 | mg/kg-day | 80% | 3.2E-01 | mg/kg-day | Kidney | 300 | HEAST | 1-Jul-97 |
| Lead | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| M, P-Xylene | Chronic | 2E+00 | mg/kg-day | 80% | 1.6E+00 | mg/kg-day | Body Weight | 100 | IRIS | 20-Nov-00 |
| Manganese (water) | Chronic | 2E-02 | mg/kg-day | 5% | 1.0E-03 | mg/kg-day | CNS | 3 | IRIS | 20-Nov-00 |
| Manganese (soil) | Chronic | 7E-02 | mg/kg-day | 5% | 3.5E-03 | mg/kg-day | CNS | 1 | N/A | N/A |
| Mercury (elemental) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Methyl Mercury | Chronic | 1E-04 | mg/kg-day | 20% | 2E-05 | mg/kg-day | Nervous System | 10 | IRIS | 20-Nov-00 |
| Methyl Ethyl Ketone (2-Butanone) | Chronic | 6E-01 | mg/kg-day | 80% | 4.8E-01 | mg/kg-day | Fetus | 3000 | IRIS | 20-Nov-00 |
| Methylene Chloride | Chronic | 6E-02 | mg/kg-day | 80% | 4.8E-02 | mg/kg-day | Liver | 100 | IRIS | 20-Nov-00 |
| Naphthalene | Chronic | 2E-02 | mg/kg-day | 50% | 1.0E-02 | mg/kg-day | Body Weight | 3000 | IRIS | 20-Nov-00 |
| Nickel | Chronic | 2E-02 | mg/kg-day | 27% | 5.4E-03 | mg/kg-day | Body Weight | 300 | IRIS | 20-Nov-00 |
| O-Xylene | Chronic | 2E+00 | mg/kg-day | 80% | 1.6E+00 | mg/kg-day | Whole Body | 100 | IRIS | 20-Nov-00 |
| PCB-1016 (Aroclor 1016) | Chronic | 7E-05 | mg/kg-day | 50% | 2.5E-07 | mg/kg-day | Fetus | 100 | IRIS | 20-Nov-00 |
| PCB-1242 (Aroclor 1242 | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| PCB-1260 (Aroclor 1260) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Pentachlorophenol | Chronic | 3E-02 | mg/kg-day | 50% | 1.5E-02 | mg/kg-day | Liver/Kidney | 100 | IRIS | 20-Nov-00 |
| Phenanthrene | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Pyrene | Chronic | 3E-02 | mg/kg-day | 87% | 2.6E-02 | mg/kg-day | Kidney | 3000 | IRIS | 20-Nov-00 |
| Selenium | Chronic | 5E-03 | mg/kg-day | 20% | 1.0E-03 | mg/kg-day | Whole Body | 3 | IRIS | 20-Nov-00 |
| Silver | Chronic | 5E-03 | mg/kg-day | 20% | 1.0E-03 | mg/kg-day | Skin | 3 | IRIS | 20-Nov-00 |
| TEQ of 2,3,7,8-TCDD | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Thallium | Chronic | 8E-05 | mg/kg-day | 15% | 1.2E-05 | mg/kg-day | NOAEL | 3000 | IRIS | 20-Nov-00 |
| Toluene | Chronic | 2E-01 | mg/kg-day | 80% | 1.6E-01 | mg/kg-day | Liver/Kidney | 1000 | IRIS | 20-Nov-00 |
| Trichloroethylene (TCE) | Chronic | 6E-03 | mg/kg-day | 100% | 6E-03 | mg/kg-day | | | NCEA | 13-Apr-00 |

ROD Table 23

**TABLE 5.1**
**NON-CANCER TOXICITY DATA -- ORAL/DERMAL**
**JACKSONVILLE ASH SITES**
**5TH & CLEVELAND**

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Oral to Dermal Adjustment Factor (1) | Adjusted Dermal RfD (2) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates of RfD: Target Organ (3) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|---|
| Trichlorofluoromethane | Chronic | 3E-01 | mg/kg-day | 80% | 2.4E-01 | mg/kg-day | Whole Body | 1000 | IRIS | 20-Nov-00 |
| Vanadium | Chronic | 7E-03 | mg/kg-day | 20% | 1.4E-03 | mg/kg-day | N/A | 100 | HEAST | 20-Nov-00 |
| Xylenes, Total | Chronic | 2E+00 | mg/kg-day | 80% | 1.6E+00 | mg/kg-day | Body Weight | 100 | IRIS | 20-Nov-00 |
| Zinc | Chronic | 3E-01 | mg/kg-day | 20% | 6.0E-02 | mg/kg-day | Blood | 3 | IRIS | 20-Nov-00 |

N/A = Not Applicable
CNS = Central nervous system
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment
Other = Region III Risk-Based Concentration Table
(1) Refer to RAGS, Part A and text for an explanation.
(2) Provide equation used for derivation.
(3) For IRIS values, provided the date IRIS was searched.
For HEAST values, provided the date of HEAST.
NCEA values obtained from Region III RBC Table, dated 04/13/00.

ROD Table 23

**TABLE 5.2**
**NON-CANCER TOXICITY DATA -- INHALATION**
**JACKSONVILLE ASH SITES**
**5TH & CLEVELAND**

| Chemical of Potential Concern | Chronic/ Subchronic | Value Inhalation RfC | Units | Adjusted Inhalation RfD (1) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfC:RfD: Target Organ | Dates (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|
| Chloroform | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 1,2-Dibromo-3-chloropropanol | Chronic | 2E-04 | mg/m3 | 5.7E-05 | mg/kg-day | Testicles | 1000 | IRIS | 20-Feb-01 |
| Ethylbenzene | Chronic | 1E+00 | mg/m3 | 2.9E-01 | mg/kg-day | Developmental | 300 | IRIS | 20-Nov-00 |
| (3- and/or 4-)Methylphenol | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Xylene (Total) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Benzo(a)pyrene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Napthalene | Chronic | 3E-03 | mg/m3 | 9.0E-04 | mg/kg-day | Respiratory Tract | 3000 | IRIS | 20-Nov-00 |
| Aldrin | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Dieldrin | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Aluminum | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Antimony | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Arsenic | Chronic | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Barium | Chronic | N/A | N/A | 1.4E-04 | mg/kg-day | N/A | N/A | N/A | N/A |
| Beryllium | Chronic | 2E-02 | ug/m3 | 5.7E-06 | mg/kg-day | Respiratory Tract | 10 | IRIS | 20-Nov-00 |
| Cadmium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Chloroethane | Chronic | 1E+01 | mg/m3 | 2.9E+00 | mg/kg-day | Fetus | 300 | IRIS | 20-Nov-00 |
| Chromium VI | Chronic | 1E-04 | mg/m3 | 2.9E-05 | mg/kg-day | Respiratory Tract | 300 | IRIS | 20-Nov-00 |
| Cobalt | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Copper | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 1,4-Dichlorobenzene | Chronic | 8E-01 | mg/m3 | 2.3E-01 | mg/kg-day | Liver | 100 | IRIS | 20-Nov-00 |
| Iron | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Lead | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Manganese (soil) | Chronic | 5E-05 | mg/m3 | 1.4E-05 | mg/kg-day | CNS | 1,000 | IRIS | 20-Nov-00 |
| Manganese (water) | Chronic | 5E-05 | mg/m3 | 1.4E-05 | mg/kg-day | CNS | 1,000 | IRIS | 20-Nov-00 |
| Mercury Chloride | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Mercury (elemental) | Chronic | 3E-04 | mg/m3 | 8.6E-05 | mg/kg-day | Nervous System | 30 | IRIS | 20-Nov-00 |
| Methyl Mercury | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Silver | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Nickel | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Thallium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Vanadium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| Zinc | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

N/A = Not Applicable
CNS = Central nervous system
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment
(1) Explanation of derivation provided in text.
(2) For IRIS values, provided the date IRIS was searched
For HEAST values, provided the date of HEAST

ROD Table 24

5 9 0098

# TABLE 5.1
## NON-CANCER TOXICITY DATA – ORAL/DERMAL
## JACKSONVILLE ASH SITES
## LONNIE C. MILLER

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Oral to Dermal Adjustment Factor (1) | Adjusted Dermal RfD (2) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates of RfD: Target Organ (3) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | Chronic | 6E-02 | mg/kg-day | 50% | 3.0E-02 | mg/kg-day | Liver | 3000 | IRIS | 05/01 |
| Acenaphthylene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Alpha Chlordane | Chronic | 5E-004 | mg/kg-day | 50% | 2.5E-004 | mg/kg-day | Liver | 300 | | 05/01 |
| Aluminum | Chronic | 1E+00 | mg/kg-day | 10% | 1.0E-01 | mg/kg-day | | | NCEA | 05/01 |
| Anthracene | Chronic | 3E-01 | mg/kg-day | 50% | 1.5E-002 | mg/kg-day | N/A | 3000 | IRIS | 05/01 |
| Antimony | Chronic | 4E-04 | mg/kg-day | 1% | 4.0E-06 | mg/kg-day | Blood | 1000 | IRIS | 05/01 |
| Arsenic | Chronic | 3E-04 | mg/kg-day | 95% | 2.9E-004 | mg/kg-day | Skin | 3 | IRIS | 05/01 |
| Barium | Chronic | 7E-02 | mg/kg-day | 7% | 4.9E-03 | mg/kg-day | Kidney | 3 | IRIS | 05/01 |
| Benzo(a)Anthracene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Benzo(a)Pyrene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Benzo(b)Fluoranthene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Benzo(g,h,i)Perylene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Benzo(k)Fluoranthene | Chronic | 1E-002 | mg/kg-day | 80% | 8.0E-03 | mg/kg-day | Liver | 1000 | IRIS | 05/01 |
| Beryllium | Chronic | 2E-03 | mg/kg-day | 20% | 4.0E-004 | mg/kg-day | Small Intestine | 300 | IRIS | 05/01 |
| Beta BHC (Beta Hexachlorocyclohexane) | Chronic | 2E-04 | mg/kg-day | 50% | 1.0E-004 | mg/kg-day | Liver Tumors | | NCEA | 05/01 |
| bis(2-Ethylhexyl)Phthalate | Chronic | 2E-02 | mg/kg-day | 55% | 1.1E-02 | mg/kg-day | Liver | 1000 | IRIS | 05/01 |
| Cadmium | Chronic | 5E-04 | mg/kg-day | 5% | 2.5E-05 | mg/kg-day | Kidney | 10 | IRIS | 05/01 |
| Calcium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Carbazole | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Chromium Total | Chronic | 3E-03 | mg/kg-day | 2% | 6.0E-05 | mg/kg-day | Skin | 900 | IRIS | 05/01 |
| Chrysene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Cobalt | Chronic | 2E-02 | mg/kg-day | 20% | 4E-004 | mg/kg-day | | | NCEA | 05/01 |
| Copper | Chronic | 4E-002 | mg/kg-day | 20% | 8.0E-003 | mg/kg-day | GI Tract | 20 | HEAST | 07/97 |
| Cyanide | Chronic | 2E-02 | mg/kg-day | 20% | 4.0E-003 | mg/kg-day | Whole Body | 500 | IRIS | 05/01 |
| p,p'-DDD | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| p,p'-DDE | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| p,p'-DDT | Chronic | 5E-04 | mg/kg-day | 50% | 2.5E-004 | mg/kg-day | Liver | 100 | IRIS | 05/01 |
| Dibenz(a,h)Anthracene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Dibenzofuran | Chronic | 4E-03 | mg/kg-day | 50% | 2E-003 | mg/kg-day | | | NCEA | 05/01 |
| cis-1,2-Dichloroethylene | Chronic | 1E-02 | mg/kg-day | 100% | 1E-02 | mg/kg-day | Blood | 3000 | HEAST | 07/97 |
| Diethyl Phthalate | Chronic | 8E-001 | mg/kg-day | 50% | 4.0E-001 | mg/kg-day | N/A | 1000 | IRIS | 05/01 |
| Dieldrin | Chronic | 5E-05 | mg/kg-day | 50% | 2.5E-05 | mg/kg-day | Liver | 100 | IRIS | 05/01 |
| Di-n-butylphthalate | Chronic | 1E-001 | mg/kg-day | 50% | 5.0E-002 | mg/kg-day | N/A | 1000 | IRIS | 05/01 |
| Endrin | Chronic | 3E-04 | mg/kg-day | 50% | 1.5E-04 | mg/kg-day | Liver | 100 | IRIS | 05/01 |
| Fluoranthene | Chronic | 4E-02 | mg/kg-day | 50% | 2.0E-02 | mg/kg-day | Liver | 3000 | IRIS | 05/01 |
| Fluorene | Chronic | 4E-02 | mg/kg-day | 58% | 2.3E-02 | mg/kg-day | Deceased Cell Count | 3000 | IRIS | 05/01 |
| gamma BHC (Lindane) | Chronic | 3E-04 | mg/kg-day | 50% | 1.5E-04 | mg/kg-day | Liver/Kidney | 1000 | IRIS | 05/01 |
| Indeno(1,2,3-c,d)Pyrene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Iron | Chronic | 3E-01 | mg/kg-day | 15% | 4.5E-02 | mg/kg-day | | | NCEA | 05/01 |

ROD Table 25

**TABLE 5.1**
**NON-CANCER TOXICITY DATA -- ORAL/DERMAL**
**JACKSONVILLE ASH SITES**
**LONNIE C. MILLER**

| Chemical of Potential Concern | Chronic/ Subchronic | Oral RfD Value | Oral RfD Units | Oral to Dermal Adjustment Factor (1) | Adjusted Dermal RfD (2) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates of RfD: Target Organ (3) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|---|
| Lead | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Magnesium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Manganese (soil) | Chronic | 2E-02 | mg/kg-day | 5% | 4E-003 | mg/kg-day | CNS | 1 | IRIS | 05/01 |
| 3-Methylphenol (m-cresol) | Chronic | 5E-02 | mg/kg-day | 84% | 4.2E-02 | mg/kg-day | CNS | 1000 | IRIS | 05/01 |
| 4-Methylphenol (p-cresol) | Chronic | 5E-03 | mg/kg-day | 84% | 4.2E-03 | mg/kg-day | CNS | 1000 | HEAST | 07/97 |
| Mercury (elemental) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Naphthalene | Chronic | 2E-02 | mg/kg-day | 50% | 1.0E-02 | mg/kg-day | Body Weight | 3000 | IRIS | 05/01 |
| Nickel | Chronic | 2E-02 | mg/kg-day | 27% | 5.4E-03 | mg/kg-day | Body Weight | 300 | IRIS | 05/01 |
| PCB-1248 (Aroclor 1248) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| PCB-1254 (Aroclor 1254) | Chronic | 2E-05 | mg/kg-day | 50% | 1E-005 | mg/kg-day | | | IRIS | 05/01 |
| PCB-1260 (Aroclor 1260) | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Phenanthrene | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Potassium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Pyrene | Chronic | 3E-02 | mg/kg-day | 87% | 2.6E-002 | mg/kg-day | Kidney | 3000 | IRIS | 05/01 |
| Selenium | Chronic | 5E-03 | mg/kg-day | 20% | 1.0E-003 | mg/kg-day | Whole Body | 3 | IRIS | 05/01 |
| Silver | Chronic | 5E-03 | mg/kg-day | 20% | 1.0E-03 | mg/kg-day | Skin | 3 | IRIS | 05/01 |
| Sodium | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| TEQ of 2,3,7,8-TCDD | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | 05/01 |
| Thallium | Chronic | 8E-05 | mg/kg-day | 15% | 1.2E-05 | mg/kg-day | NOAEL | 3000 | IRIS | 05/01 |
| Vanadium | Chronic | 7E-03 | mg/kg-day | 20% | 1.4E-03 | mg/kg-day | N/A | 100 | HEAST | 07/97 |
| Vinyl Chloride | Chronic | 3E-03 | mg/kg-day | 100% | 3E-03 | mg/kg-day | Liver | 30 | IRIS | 05/01 |
| Zinc | Chronic | 3E-01 | mg/kg-day | 20% | 6.0E-02 | mg/kg-day | Blood | 3 | IRIS | 05/01 |

N/A = Not Applicable
CNS = Central nervous system
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment
Other = Region III Risk-Based Concentration Table
(1) Refer to RAGS, Part A and text for an explanation.
(2) Provide equation used for derivation.
(3) For IRIS values, provided the date IRIS was searched.
For HEAST values, provided the date of HEAST.
NCEA values obtained from Region III RBC Table, dated 04/13/00.

ROD Table 25

## TABLE 5.2
## NON-CANCER TOXICITY DATA -- INHALATION
## JACKSONVILLE ASH SITES
## LONNIE C. MILLER

| Chemical of Potential Concern | Chronic/ Subchronic | Value Inhalation RfC | Units | Adjusted Inhalation RfD (1) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|
| Acenaphthene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Acenaphthylene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Alpha Chlordane | Chronic | 7E-004 | mg/m3 | 2E-004 | mg/kg-day | Hepatic Necrosis | 1000 | IRIS | 05/01 |
| Aluminum | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Anthracene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Antimony | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Arsenic | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Barium | N/A | N/A | N/A | 1.4E-004 | mg/kg-day | N/A | N/A | IRIS | 05/01 |
| Benzo(a)Anthracene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Benzo(a)Pyrene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Benzo(b)Fluoranthene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Benzo(g,h,i)Perylene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Benzo(k)Fluoranthene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Beryllium | Chronic | 2E-02 | mg/m3 | 5.7E-006 | mg/kg-day | Small Intestine | 300 | IRIS | 05/01 |
| Beta BHC (Beta Hexachlorocycl | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| bis(2-Ethylhexyl)Phthalate | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Cadmium | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Calcium | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Carbazole | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Chromium Total | Chronic | 1E-004 | mg/m3 | 2.0E-006 | mg/kg-day | N/A | 1 | IRIS | 05/01 |
| Chrysene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Cobalt | N/A | N/A | N/A | 6E-006 | mg/kg-day | N/A | N/A | NCEA | 05/01 |
| Copper | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Cyanide | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| p,p'-DDD | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| p,p'-DDE | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| p,p'-DDT | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Dibenz(a,h)Anthracene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Dibenzofuran | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| cis-1,2-Dichloroethylene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Diethyl Phthalate | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Dieldrin | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Di-n-butylphthalate | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Endrin | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Fluoranthene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Fluorene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| gamma BHC (Lindane) | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Indeno(1,2,3-c,d)Pyrene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Iron | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Lead | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Magnesium | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Manganese (soil) | Chronic | 5E-005 | mg/m3 | 1.4E-005 | mg/kg-day | CNS | 1000 | IRIS | 05/01 |

ROD Table 26

TABLE 5.2
NON-CANCER TOXICITY DATA -- INHALATION
JACKSONVILLE ASH SITES
LONNIE C. MILLER

| Chemical of Potential Concern | Chronic/ Subchronic | Value Inhalation RfC | Units | Adjusted Inhalation RfD (1) | Units | Primary Target Organ | Combined Uncertainty/ Modifying Factors | Sources of RfD: Target Organ | Dates (2) (MM/DD/YY) |
|---|---|---|---|---|---|---|---|---|---|
| 3-Methylphenol (m-cresol) | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| 4-Methylphenol (p-cresol) | N/A | N/A | N/A | | N/A | N/A | N/A | HEAST | 07/97 |
| Mercury (elemental) | Chronic | 3E-004 | mg/m3 | 8.6E-005 | mg/kg-day | N/A | 30 | IRIS | 05/01 |
| Naphthalene | Chronic | 3E-003 | mg/m3 | 9.0E-004 | mg/kg-day | Body Weight | 3000 | IRIS | 05/01 |
| Nickel | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| PCB-1260 (Aroclor 1260) | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Phenanthrene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Potassium | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Pyrene | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Selenium | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Silver | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Sodium | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| TEQ of 2,3,7,8-TCDD | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Thallium | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Vanadium | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |
| Vinyl Chloride | Chronic | 1E-01 | mg/m3 | 2.9E-02 | mg/kg-day | Liver | 30 | IRIS | 05/01 |
| Zinc | N/A | N/A | N/A | | N/A | N/A | N/A | IRIS | 05/01 |

N/A = Not Applicable
CNS = Central nervous system
IRIS = Integrated Risk Information System
HEAST = Health Effects Assessment Summary Tables
NCEA = National Center for Environmental Assessment
Other = Region III Risk-Based Concentration Table
(1) Refer to RAGS, Part A and text for an explanation.
(2) Provide equation used for derivation.
(3) For IRIS values, provided the date IRIS was searched.
For HEAST values, provided the date of HEAST.
NCEA values obtained from Region III RBC Table, dated 04/13/00.

ROD Table 26

baseline risk assessment. However, lead risks in all residential areas were evaluated by screening detected concentrations against EPA's residential screening level of 400 mg/kg. This screening level is also based on the lead model. As lead is not included in the cancer risks or hazard calculation, the presence of lead > 400 mg/kg is sufficient to trigger remediation in residential areas.

### 5.5.2 Evaluation of Carcinogenic Risk

The incremental risk of developing cancer from exposure to a chemical at the site was defined as the additional probability that an individual exposed will develop cancer during his or her lifetime (assumed to be 70 years). This value was calculated from the average daily intake over a lifetime (CDI) and the slope factor (SF) for the chemical as follows (EPA, 1989):

$$\text{Risk} = \text{CDI X SF}$$

When the product of CDI x SF is greater than 0.01, this expression may be estimated as:

$$\text{Risk} = 1 - \exp^{(-\text{CDI X SF})}$$

An excess lifetime cancer risk of $1 \times 10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site-related exposures is $1 \times 10^{-4}$ to $1 \times 10^{-6}$.

The surface and subsurface soil in the incinerator area of the Forest Street was determined to have a risk greater than the EPA acceptable risk range for carcinogens at $4 \times 10^{-4}$ (surface soil) and $1 \times 10^{-3}$ (subsurface soil). All ten evaluated residential properties have carcinogenic risks greater than $1 \times 10^{-6}$ and two of the ten have greater than the $1 \times 10^{-4}$ risk. This indicates a potential risk for surface and subsurface soils at the site.

The surface and subsurface soil in the Emmett Reed Park (former incinerator area) of the 5th & Cleveland site was determined to have a risk greater than or equal to the EPA risk range for carcinogens at $1 \times 10^{-4}$ and $3 \times 10^{-4}$. Three of the ten evaluated residential properties have greater than a $1 \times 10^{-4}$ risk. This indicates a potential risk for surface and subsurface soils at the site. Groundwater at the 5th & Cleveland site has a carcinogenic risk of $1.3 \times 10^{-4}$. Slightly higher that EPA acceptable risk range of $1 \times 10^{-4}$ to $1 \times 10^{-6}$.

The surface and subsurface soil in the Lonnie C. Miller, Sr. Park was determined to have a risk greater than the EPA acceptable risk range for carcinogens at $5 \times 10^{-4}$ and $6 \times 10^{-4}$. One of the ten evaluated residential properties have greater than a $1 \times 10^{-4}$ risk. This indicates a potential risk for surface and subsurface soils at the site. Groundwater at the Lonnie C. Miller, Sr. Park site has a carcinogenic risk of $1.1 \times 10^{-5}$.

A summary of carcinogenic risks for all exposure pathways and media is presented in Tables 27, 28 and 29. A detailed summary of risks that exceed a carcinogenic risk of $1 \times 10^{-6}$ is presented in the tables in Appendix A of this ROD.

### 5.5.3 Evaluation of Non-Carcinogenic Effects

The potential for noncarcinogenic effects was evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived for a similar exposure period. A RfD represents a level that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of exposure to toxicity is called a hazard quotient (HQ). A HQ less than 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely. The Hazard Index (HI) is generated by adding the HQs for all chemical(s) of concern that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which a given individual may reasonably be exposed. A HI less than 1 indicates that, based on the sum of all HQ's from different contaminants and exposure routes, toxic noncarcinogenic effects from all contaminants are unlikely. A HI greater than 1 indicates that site-related exposures may present a risk to human health. The HQ is calculated as follows (EPA, 1989):

$$HQ = DI/RfD$$

Where:

| | | |
|---|---|---|
| HQ | = | Hazard Quotient (unitless) |
| DI | = | Daily Intake (mg/kg/day) |
| RfD | = | Reference Dose (mg/kg/day) |

All the HQ values for chemicals within each exposure pathway are summed to yield the HI. Each pathway HI within a land use scenario (e.g., future child resident) is summed to yield the total HI for the receptor. If the value of the total HI is less than 1.0, it is interpreted to mean that the risk of noncarcinogenic injury is low. If the total HI is greater than 1.0, it is indicative of some degree of noncarcinogenic risk, or effect, and contaminants of concern are selected (EPA, 1995a). Contaminants of concern are those COPCs that contribute a HQ of 0.1 or greater to any pathway evaluated for the use scenario. Using the HQ equation, the chronic DI values, and the RfD values, a hazard index for current and future child residents was estimated by calculating a HQ for each chemical of potential concern associated with a complete pathway and exposure point. Only chronic HIs are derived, as the subchronic risks will always be equal to or less than the chronic risks.

The surface (HI = 4) and subsurface (HI = 543) soil in the incinerator area of the Forest Street was determined to have a HI > 1. Three of the ten evaluated residential properties have a HI greater than or equal to1. This indicates a potential risk for surface and subsurface soils at the site. Groundwater at the Forest Street site has a HI = 5.4.

The surface (HI = 92) and subsurface (HI = 12) soil in the Emmett Reed Park (former incinerator area) of the 5th & Cleveland site was determined to have a HI > 1. Four of the ten evaluated residential properties have HQ greater than or equal to 1. This indicates a potential risk for surface and subsurface soils at the site. Groundwater at the 5th & Cleveland site has a HI = 3

# TABLE 11.2
## SUMMARY OF CARCINOGENIC RISKS
## JACKSONVILLE ASH SITE
## FOREST STREET INCINERATOR

| Scenario Timeframe | Receptor Population | Exposure Point | Exposure Medium | Exposure Pathway | Pathway Risk Index |
|---|---|---|---|---|---|
| Current | Resident (Child and Adult) | Forest Stsreet Site Proper | Surface Soil | Incidental Ingestion<br>Dermal Contact | 2.6E-005<br>6.0E-006 |
| | | McCoy's Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 3.4E-07<br>3.9E-04 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **4E-04** |
| Future | Resident (Child and Adult) | Forest Street Site Proper | Surface Soil | Incidental Ingestion<br>Dermal Contact | 2.6E-05<br>6.0E-006 |
| | | McCoy's Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 3.4E-07<br>3.9E-04 |
| | | Tap | Groundwater | Ingestion | -- |
| | | | | **Total Incremental Lifetime Cancer Risk** | **4E-04** |
| Future | Resident (Child and Adult) | Forest Street Site Proper | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 5.3E-04<br>3.4E-05 |
| | | McCoy's Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 3.4E-07<br>3.9E-04 |
| | | Tap | Groundwater | Ingestion | -- |
| | | | | **Total Incremental Lifetime Cancer Risk** | **1E-03** |
| Current | Adult Worker | FDOT I-10/95 Interchange East | Surface Soil | Incidental Ingestion<br>Dermal Contact | 1.6E-06<br>1.4E-06 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **3E-06** |
| Future | Adult Worker | FDOT I-10/95 Interchange East | Srbsurface Soil | Incidental Ingestion<br>Dermal Contact | 1.7E-06<br>1.7E-06 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **3E-06** |
| Current | Adult Worker | FDOT I-10/95 Interchange West | Surface Soil | Incidental Ingestion<br>Dermal Contact | 2.4E-06<br>1.2E-07 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **3E-06** |
| Future | Adult Worker | FDOT I-10/95 Interchange West | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 3.3E-006<br>1.7E-07 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **3E-06** |
| Current | Adult Worker | Area North of McCoy's Creek | Surface Soil | Incidental Ingestion<br>Dermal Contact | 8.2E-07<br>4.1E-08 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **9E-06** |
| Future | Adult Worker | Area North of McCoy's Creek | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 7.9E-07<br>4.0E-08 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **8E-07** |

# TABLE 11.2
# SUMMARY OF CARCINOGENIC RISKS
# JACKSONVILLE ASH SITE
# 5th AND CLEVELAND

| Scenario Timeframe | Receptor Population | Exposure Point | Exposure Medium | Exposure Pathway | Pathway Hazard Index |
|---|---|---|---|---|---|
| Current | Child Resident (Child and Adult) | Emmett Reed Community Center | Surface Soil | Incidental Ingestion<br>Dermal Contact | 1.5E-005<br>7.8E-006 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 1.0E-008<br>1.2E-005 |
| | | | | **Total Hazard Index** | **4E-005** |
| Future | Resident (Child and Adult) | Emmett Reed Community Center | Surface Soil | Incidental Ingestion<br>Dermal Contact | 1.5E-005<br>7.8E-006 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 1.0E-008<br>1.2E-005 |
| | | Tap | Groundwater | Ingestion<br>Inhalation<br>Dermal | 1.3E-004<br>5.8E-008<br>4.2E-005 |
| | | | | **Total Hazard Index** | **2E-004** |
| Future | Resident (Child and Adult) | Emmett Reed Community Center | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 4.2E-005<br>8.1E-006 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 1.0E-008<br>1.2E-005 |
| | | Tap | Groundwater | Ingestion<br>Inhalation<br>Dermal | 1.3E-004<br>5.8E-008<br>4.2E-005 |
| | | | | **Total Hazard Index** | **2E-004** |
| Current | Resident (Child and Adult) | Emmett Reed Park Community Center | Surface Soil | Incidental Ingestion<br>Dermal Contact | 7.7E-005<br>3.2E-005 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 1.0E-008<br>1.2E-005 |
| | | | | **Total Hazard Index** | **1E-004** |
| Future | Resident (Child and Adult) | Emmett Reed Park | Surface Soil | Incidental Ingestion<br>Dermal Contact | 7.7E-005<br>3.2E-005 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 1.0E-008<br>1.2E-005 |
| | | Tap | Groundwater | Ingestion<br>Inhalation<br>Dermal | 1.3E-004<br>5.8E-008<br>4.2E-005 |
| | | | | **Total Hazard Index** | **3E-004** |

ROD Table 28

# TABLE 11.2
# SUMMARY OF CARCINOGENIC RISKS
# JACKSONVILLE ASH SITE
# 5th AND CLEVELAND

| Scenario Timeframe | Receptor Population | Exposure Point | Exposure Medium | Exposure Pathway | Pathway Hazard Index |
|---|---|---|---|---|---|
| Future | Resident (Child and Adult) | Emmett Reed Park | Subsurface Soil | Incidental Ingestion | 1.1E-004 |
| | | | | Dermal Contact | 2.3E-005 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion | 1.0E-008 |
| | | | | Dermal Contact | 1.2E-005 |
| | | Tap | Groundwater | Ingestion | 1.3E-004 |
| | | | | Inhalation | 5.8E-008 |
| | | | | Dermal | 4.2E-005 |
| | | | | **Total Hazard Index** | **3E-004** |
| Current | Resident (Child and Adult) | Apartment Complex | Surface Soil | Incidental Ingestion | 7.0E-006 |
| | | | | Dermal Contact | 3.2E-006 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion | 1.0E-008 |
| | | | | Dermal Contact | 1.2E-005 |
| | | | | **Total Hazard Index** | **2E-005** |
| Future | Resident (Child and Adult) | Apartment Complex | Surface Soil | Incidental Ingestion | 7.0E-006 |
| | | | | Dermal Contact | 3.2E-006 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion | 1.0E-008 |
| | | | | Dermal Contact | 1.2E-005 |
| | | Tap | Groundwater | Ingestion | 1.3E-004 |
| | | | | Inhalation | 5.8E-008 |
| | | | | Dermal | 4.2E-005 |
| | | | | **Total Hazard Index** | **2E-004** |
| Future | Resident (Child and Adult) | Apartment Complex | Subsurface Soil | Incidental Ingestion | 1.9E-005 |
| | | | | Dermal Contact | 2.4E-006 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion | 1.0E-008 |
| | | | | Dermal Contact | 1.2E-005 |
| | | Tap | Groundwater | Ingestion | 1.3E-004 |
| | | | | Inhalation | 5.8E-008 |
| | | | | Dermal | 4.2E-005 |
| | | | | **Total Hazard Index** | **2E-004** |

ROD Table 28

**TABLE 11.2**
**SUMMARY OF CARCINOGENIC RISKS**
**JACKSONVILLE ASH SITE**
**LONNIE C. MILLER, SR., PARK**

| Scenario Timeframe | Receptor Population | Exposure Point | Exposure Medium | Exposure Pathway | Pathway Hazard Index |
|---|---|---|---|---|---|
| Current | Resident (Child and Adult) | Lonnie C. Miller, Sr., Park | Surface Soil | Incidental Ingestion<br>Dermal Contact | 1.6E-005<br>1.2E-05 |
| | | Unnamed Tributary | Surface Water | Incidental Ingestion<br>Dermal Contact | 4.8E-07<br>4.7E-04 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **5E-04** |
| Future | Resident (Child and Adult) | Lonnie C. Miller, Sr., Park | Surface Soil | Incidental Ingestion<br>Dermal Contact | 1.6E-05<br>1.2E-05 |
| | | Unnamed Tributary | Surface Water | Incidental Ingestion<br>Dermal Contact | 4.8E-07<br>4.7E-04 |
| | | Tap | Groundwater | Ingestion<br>Dermal Contact<br>Inhalation | 1.1E-05<br>5.9E-06<br>6.3E-08 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **5E-04** |
| Future | Resident (Child and Adult) | Lonnie C. Miller, Sr., Park | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 1.2E-04<br>2.1E-05 |
| | | Unnamed Tributary | Surface Water | Incidental Ingestion<br>Dermal Contact | 4.8E-07<br>4.7E-04 |
| | | Tap | Groundwater | Ingestion<br>Dermal Contact<br>Inhalation | 1.1E-05<br>5.9E-06<br>6.3E-08 |
| | | | | **Total Incremental Lifetime Cancer Risk** | **6E-04** |

*ROD Table 29*

The surface (HI = 18) and subsurface (HI = 32) soil in the Lonnie C. Miller, Sr. Park was determined to have a HI > 1. Six of the ten evaluated residential properties have HI greater than or equal to 1. This indicates a potential risk for surface and subsurface soils at the site. Groundwater at the Lonnie C. Miller, Sr. Park site has a HI = 1.96.

A summary of a non-carcinogenic risk for all exposure pathways and media is presented in Tables 30, 31 and 32. A detailed summary of risks that exceed a Hazard Index of 1 evaluated by target organs is presented in the tables in Appendix B of this ROD.

### 5.5.4 Evaluation of Risk in Residential Area

#### 5.5.4.1 Quantitative Evaluation of Surface Soil

EPA acting through their contractor evaluated risks and hazards that may result from exposure to surface soil at residences surrounding the sites. 220 soil samples at Forest Street, 226 soil samples at 5th & Cleveland and 106 soil samples at Lonnie Miller were collected in the residential areas to use for this evaluation. The maximum detected concentration of the detected chemicals in surface soil was compared to the corresponding EPA Region 9 PRG Based on this comparison, chemicals were retained as COPCs in surface soil in the residential areas. COPCs included carcinogenic PAHs, dioxins, and metals.

It was not feasible for the risk assessment to quantitatively evaluate exposure to surface soil from 552 locations (exposure units). Therefore, an attempt was made to identify the most highly contaminated samples so that risks and hazards could be estimated for these locations. It was assumed that risks and hazards resulting from exposure to surface soil at these locations would represent the "worst case scenario" for the yards that were sampled during the RI investigation. To this end, the surface soil analytical data were reviewed to determine which locations had the highest numbers and detected concentrations of chemicals. Based on this review, ten sample locations were selected for quantitative evaluation at each of the three sites.

According to EPA policy, the target total individual risk resulting from exposures at a Superfund site may range anywhere between 1 X $10^{-6}$ and 1 X $10^{-4}$ (EPA, 1991). Thus, remedial alternatives should be capable of reducing total potential carcinogenic risks to levels within this range for individual receptors. According to EPA guidance, if the hazard index is greater than 1 or the cumulative cancer risk is greater than a range between 1 X $10^{-6}$ to 1 X $10^{-4}$ for a land use scenario (i.e., resident), then remedial action is generally warranted. A summary of carcinogenic risks and noncarcinogenic hazards resulting from exposure to each of the thirty sample locations is discussed below.

The risk assessment assumed that one yard represented an exposure unit for a given receptor. Generally one sample was collected from each yard that was evaluated; therefore, the single soil concentration for each COPC was assumed to represent the average concentration across the yard.

EPA standard default exposure assumptions were used to calculate the risks and hazards outlined above. These exposure assumptions are conservative and are likely to overestimate risks. Also,

# TABLE 11.1
# SUMMARY OF NONCARCINOGENIC RISKS
# JACKSONVILLE ASH SITE
# FOREST STREET INCINERATOR

| Scenario Timeframe | Receptor Population | Exposure Point | Exposure Medium | Exposure Pathway | Pathway Hazard Index |
|---|---|---|---|---|---|
| Current | Child Resident | Forest Street Site Proper | Surface Soil | Incidental Ingestion<br>Dermal Contact | 2.8<br>1.7 |
| | | McCoy'sCreek | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.0005<br>0.004 |
| | | | | **Total Hazard Index** | **4** |
| Future | Child Resident | Forest Street Site Proper | Surface Soil | Incidental Ingestion<br>Dermal Contact | 2.8<br>1.7 |
| | | McCoy's Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.0005<br>0.004 |
| | | Tap | Groundwater | Ingestion | 5.4 |
| | | | | **Total Hazard Index** | **10** |
| Future | Child Resident | Forest Street Site Proper | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 391<br>147 |
| | | McCoy's Creek | Surface Water | Incidental Ingestion<br>Dermal Contact · | 0.0005<br>0.004 |
| | | Tap | Groundwater | Ingestion | 5.4 |
| | | | | **Total Hazard Index** | **543** |
| Current | Adult Worker | FDOT I-10/95 Interchange East | Surface Soil | Incidental Ingestion<br>Dermal Contact | 0.003<br>0.0001 |
| | | | | **Total Hazard Index** | **0.003** |
| Future | Adult Worker | FDOT I-10/95 Interchange East | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 0.01<br>0.0005 |
| | | | | **Total Hazard Index** | **0.01** |
| Current | Adult Worker | FDOT I-10/95 Interchange West | Surface Soil | Incidental Ingestion<br>Dermal Contact | 0.02<br>0.0007 |
| | | | | **Total Hazard Index** | **0.02** |
| Future | Adult Worker | FDOT I-10/95 Interchange Wast | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 0.3<br>0.09 |
| | | | | **Total Hazard Index** | **0.4** |
| Current | Adult Worker | Area North of McCoy's Creek | Surface Soil | Incidental Ingestion<br>Dermal Contact | 0.005<br>0.0003 |
| | | | | **Total Hazard Index** | **0.006** |
| Future | Adult Worker | Area North of McCoy's Creek | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 0.005<br>0.00025 |
| | | | | **Total Hazard Index** | **0.005** |

ROD Table 30

**TABLE 11.1**
**SUMMARY OF NONCARCINOGENIC RISKS**
**JACKSONVILLE ASH SITE**
**5th AND CLEVELAND**

| Scenario Timeframe | Receptor Population | Exposure Point | Exposure Medium | Exposure Pathway | Pathway Hazard Index |
|---|---|---|---|---|---|
| Current | Child Resident | Emmett Reed Community Center | Surface Soil | Incidental Ingestion<br>Dermal Contact | 0.5<br>0.2 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.001<br>0.01 |
| | | | | **Total Hazard Index** | **0.7** |
| Future | Child Resident | Emmett Reed Community Center | Surface Soil | Incidental Ingestion<br>Dermal Contact | 0.5<br>0.2 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.001<br>0.01 |
| | | Tap | Groundwater | Ingestion<br>Inhalation<br>Dermal | 1.3<br>1.7<br>-- |
| | | | | **Total Hazard Index** | **4** |
| Future | Child Resident | Emmett Reed Community Center | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 4.9<br>1.8 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.001<br>0.01 |
| | | Tap | Groundwater | Ingestion<br>Inhalation<br>Dermal | 1.3<br>1.7<br>-- |
| | | | | **Total Hazard Index** | **10** |
| Current | Child Resident | Emmett Reed Park | Surface Soil | Incidental Ingestion<br>Dermal Contact | 33<br>59 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.001<br>0.01 |
| | | | | **Total Hazard Index** | **92** |
| Future | Child Resident | Emmett Reed Park | Surface Soil | Incidental Ingestion<br>Dermal Contact | 33<br>59 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.001<br>0.01 |
| | | Tap | Groundwater | Ingestion<br>Inhalation<br>Dermal | 1.3<br>1.7<br>-- |
| | | | | **Total Hazard Index** | **95** |

# TABLE 11.1
## SUMMARY OF NONCARCINOGENIC RISKS
## JACKSONVILLE ASH SITE
## 5th AND CLEVELAND

| Scenario Timeframe | Receptor Population | Exposure Point | Exposure Medium | Exposure Pathway | Pathway Hazard Index |
|---|---|---|---|---|---|
| Future | Child Resident | Emmett Reed Park | Subsurface Soil | Incidental Ingestion | 7 |
| | | | | Dermal Contact | 1.7 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion | 0.001 |
| | | | | Dermal Contact | 0.01 |
| | | Tap | Groundwater | Ingestion | 1.3 |
| | | | | Inhalation | 1.7 |
| | | | | Dermal | -- |
| | | | | **Total Hazard Index** | **12** |
| Current | Child Resident | Apartment Complex | Surface Soil | Incidental Ingestion | 0.3 |
| | | | | Dermal Contact | 0.03 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion | 0.001 |
| | | | | Dermal Contact | 0.01 |
| | | | | **Total Hazard Index** | **0.3** |
| Future | Child Resident | Apartment Complex | Surface Soil | Incidental Ingestion | 0.3 |
| | | | | Dermal Contact | 0.03 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion | 0.001 |
| | | | | Dermal Contact | 0.01 |
| | | Tap | Groundwater | Ingestion | 1.3 |
| | | | | Inhalation | 1.7 |
| | | | | Dermal | -- |
| | | | | **Total Hazard Index** | **3** |
| Future | Child Resident | Apartment Complex | Subsurface Soil | Incidental Ingestion | 1.6 |
| | | | | Dermal Contact | 0.7 |
| | | Unnamed Creek | Surface Water | Incidental Ingestion | 0.001 |
| | | | | Dermal Contact | 0.01 |
| | | Tap | Groundwater | Ingestion | 1.3 |
| | | | | Inhalation | 1.7 |
| | | | | Dermal | -- |
| | | | | **Total Hazard Index** | **5** |

ROD Table 31

# TABLE 11.1
# SUMMARY OF NONCARCINOGENIC RISKS
# JACKSONVILLE ASH SITE
# LONNIE C. MILLER, SR., PARK

| Scenario Timeframe | Receptor Population | Exposure Point | Exposure Medium | Exposure Pathway | Pathway Hazard Index |
|---|---|---|---|---|---|
| Current | Child Resident | Lonnie C. Miller, Sr., Park | Surface Soil | Incidental Ingestion<br>Dermal Contact | 13.7<br>4.5 |
| | | Unnamed Tributary | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.013<br>0.051 |
| | | | | **Total Hazard Index** | **18** |
| Future | Child Resident | Lonnie C. Miller, Sr., Park | Surface Soil | Incidental Ingestion<br>Dermal Contact | 13.7<br>4.5 |
| | | Unnamed Tributary | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.013<br>0.051 |
| | | Tap | Groundwater | Ingestion<br>Dermal Contact<br>Inhalation | 1.9<br>0.0006<br>0.06 |
| | | | | **Total Hazard Index** | **20** |
| Future | Child Resident | Lonnie C. Miller, Sr., Park | Subsurface Soil | Incidental Ingestion<br>Dermal Contact | 24.7<br>7.3 |
| | | Unnamed Tributary | Surface Water | Incidental Ingestion<br>Dermal Contact | 0.01<br>0.03 |
| | | Tap | Groundwater | Ingestion<br>Dermal Contact<br>Inhalation | 1.9<br>0.0006<br>0.06 |
| | | | | **Total Hazard Index** | **32** |

*ROD Table 32*

an exposure unit should be based on the areal extent of a receptor's movements during a single day. Two types of samples were collected during the RI - Tier 1 and Tier 2. Tier 1 samples were discreet samples collected from a single location. Tier 2 samples were composite samples collected from five locations in the yard. If any of the ten samples quantitatively evaluated in the risk assessment were tier 1 samples, then the resulting risks and hazards are based on exposure to a single location in a given yard. Thus the estimated risks/hazards resulting from exposure to these yards may be over- or underestimated.

#### 5.5.4.1.1 Forest Street Incinerator

The maximum detected concentration of the 54 chemicals, that were detected in 220 surface soil samples collected from the residential areas of the Forest Street Incinerator site, was compared to the corresponding EPA Region 9 PRG. Based on this comparison, 16 chemicals were retained as COPCs in surface soil in the residential areas. COPCs included carcinogenic PAHs, dioxins, and metals.

It was not feasible for the risk assessment to quantitatively evaluate exposure to surface soil from 220 locations (exposure units). Therefore, an attempt was made to identify the most highly contaminated samples so that risks and hazards could be estimated for these locations. The surface soil analytical data were reviewed to determine which locations had the highest numbers and detected concentrations of chemicals. Based on this review, ten sample locations were selected for quantitative evaluation. A summary of carcinogenic risks and noncarcinogenic hazards resulting from exposure to each of the ten sample locations is discussed below.

Lead, one of the primary contaminants of concern at the Forest Street Incinerator site, was not included in the quantitative evaluation of risks. There are no toxicity criteria for lead; therefore, lead was evaluated qualitatively by comparing detected concentrations of this metal to EPA's residential soil screening level of 400 mg/kg. Four of the ten surface soil samples that were quantitatively evaluated had detected lead concentrations that exceeded 400 mg/kg. The lead concentrations in these four samples ranged from 660 mg/kg to 2,600 mg/kg. The remaining six samples had detected lead concentrations that ranged from 177 mg/kg to 290 mg/kg.

All ten surface soil samples evaluated as part of this assessment resulted in excess lifetime cancer risks that were within EPA's target risk range of $1 \times 10^{-6}$ to $1 \times 10^{-4}$. Exposure to two samples, each resulted in an excess lifetime cancer risk of $1 \times 10^{-4}$, which is at the upper end of the target risk range. Estimated cancer risks for the remaining eight samples ranged from $3 \times 10^{-6}$ to $7 \times 10^{-5}$.

Two of the ten samples generated hazard indices greater than 1. The hazard indices for these two samples were 6 and 3. The hazard indices for the remaining eight samples ranged from 0.1 to 1.

Table 33 presents the calculated risks and hazards at the ten surface soil samples that were quantitatively evaluated.

TABLE B.13.1
SURFACE SOIL SAMPL[illegible]OLLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH SITE - FOREST STREET INCINERATOR

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs -TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - Cancer | Adult + Child - Intake - Dermal - Cancer | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FSSB035 | ARSENIC | 0.96 | MG/KG | 0.96 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 4.2E-02 | 8.6E-04 | 1.6E-06 | 6.6E-08 | 4.2E-02 | 1.7E-06 | |
| FSSB035 | BARIUM | 48 | MG/KG | 48 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 8.9E-03 | 2.5E-03 | -- | -- | 1.1E-02 | -- | |
| FSSB035 | CHROMIUM, TOTAL | 4.8 | MG/KG | 4.8 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 2.1E-02 | 2.1E-02 | -- | -- | 4.2E-02 | -- | |
| FSSB035 | COPPER | 29 | MG/KG | 29 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 9.4E-03 | 9.4E-04 | -- | -- | 1.0E-02 | -- | |
| FSSB035 | LEAD | 177 | MG/KG | 177 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB035 | MANGANESE | 83 | MG/KG | 83 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.5E-02 | 6.2E-03 | -- | -- | 2.2E-02 | -- | |
| FSSB035 | MERCURY | | | | | | | | | | | | | | | | | | | | |
| FSSB035 | ZINC | 0.15 | MG/KG | 0.15 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 6.5E-06 | 6.5E-07 | -- | -- | 7.2E-06 | -- | |
| FSSB035 | BENZO(a)ANTHRACENE | 5600 | UG/KG | 5.6 | MG/KG | 0.56 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB035 | BENZO(a)PYRENE | 5100 | UG/KG | 5.1 | MG/KG | 5.1 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB035 | BENZO(b)FLUORANTHENE | 5400 | UG/KG | 5.4 | MG/KG | 0.54 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB035 | BENZO(k)FLUORANTHENE | 2700 | UG/KG | 2.7 | MG/KG | 0.027 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB035 | DIBENZ(a,h)ANTHRACENE | 1300 | UG/KG | 1.3 | MG/KG | 1.3 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB035 | INDENO(1,2,3-c,d)PYRENE | 2500 | UG/KG | 2.5 | MG/KG | 0.25 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB035 | TEF CPAHs | -- | -- | -- | MG/KG | 7.78 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 6.2E-05 | 4.2E-05 | -- | 1.0E-04 | |
| | | | | | | | | | | | | | | | | | | | 1.3E-01 | 1.1E-04 | 1.1E-04 |
| FSSB081 | ANTIMONY | 0.82 | MG/KG | 0.82 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 2.7E-02 | 5.3E-02 | -- | -- | 8.0E-02 | -- | |
| FSSB081 | ARSENIC | 7.4 | MG/KG | 7.4 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 3.2E-01 | 6.6E-03 | 1.2E-05 | 5.1E-07 | 3.3E-01 | 1.3E-05 | |
| FSSB081 | BARIUM | 210 | MG/KG | 210 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 3.9E-02 | 1.1E-02 | -- | -- | 5.0E-02 | -- | |
| FSSB081 | CHROMIUM, TOTAL | 14 | MG/KG | 14 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 6.1E-02 | 6.1E-02 | -- | -- | 1.2E-01 | -- | |
| FSSB081 | COPPER | 220 | MG/KG | 220 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 7.2E-02 | 7.2E-03 | -- | -- | 7.9E-02 | -- | |
| FSSB081 | LEAD | 220 | MG/KG | 220 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB081 | MANGANESE | 180 | MG/KG | 180 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 3.3E-02 | 1.3E-02 | -- | -- | 4.7E-02 | -- | |
| FSSB081 | MERCURY | | | | | | | | | | | | | | | | | | | | |
| FSSB081 | ZINC | 600 | MG/KG | 600 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 2.6E-02 | 2.6E-03 | -- | -- | 2.9E-02 | -- | |
| FSSB081 | BENZO(a)ANTHRACENE | 180 | UG/KG | 0.18 | MG/KG | 0.018 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB081 | BENZO(a)PYRENE | 250 | UG/KG | 0.25 | MG/KG | 0.25 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB081 | BENZO(b)FLUORANTHENE | 220 | UG/KG | 0.22 | MG/KG | 0.022 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB081 | BENZO(k)FLUORANTHENE | 210 | UG/KG | 0.21 | MG/KG | 0.0021 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB081 | INDENO(1,2,3-c,d)PYRENE | 150 | UG/KG | 0.15 | MG/KG | 0.015 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB081 | TEF CPAHs | -- | -- | -- | MG/KG | 0.31 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 2.5E-06 | 1.7E-06 | -- | 4.2E-06 | |
| | | | | | | | | | | | | | | | | | | | 7.3E-01 | 1.7E-05 | 1.7E-05 |
| FSSB116 | ANTIMONY | 1.5 | MG/KG | 1.5 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 4.9E-02 | 9.8E-02 | -- | -- | 1.5E-01 | -- | |
| FSSB116 | ARSENIC | 1.9 | MG/KG | 1.9 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 8.2E-02 | 1.7E-03 | 3.1E-06 | 1.3E-07 | 8.4E-02 | 3.3E-06 | |
| FSSB116 | BARIUM | 130 | MG/KG | 130 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.4E-02 | 5.9E-03 | -- | -- | 3.1E-02 | -- | |
| FSSB116 | CHROMIUM, TOTAL | 8.4 | MG/KG | 8.4 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 3.6E-02 | 3.6E-02 | -- | -- | 7.3E-02 | -- | |
| FSSB116 | COPPER | 250 | MG/KG | 250 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 8.1E-02 | 8.1E-03 | -- | -- | 8.9E-02 | -- | |
| FSSB116 | LEAD | 290 | MG/KG | 290 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB116 | MANGANESE | 140 | MG/KG | 140 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 2.6E-02 | 1.0E-02 | -- | -- | 3.6E-02 | -- | |
| FSSB116 | MERCURY | | | | | | | | | | | | | | | | | | | | |
| FSSB116 | ZINC | 650 | MG/KG | 650 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 2.8E-02 | 2.8E-03 | -- | -- | 3.1E-02 | -- | |
| FSSB116 | BENZO(a)ANTHRACENE | 600 | UG/KG | 0.6 | MG/KG | 0.06 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB116 | BENZO(a)PYRENE | 540 | UG/KG | 0.54 | MG/KG | 0.54 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB116 | BENZO(b)FLUORANTHENE | 510 | UG/KG | 0.51 | MG/KG | 0.051 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB116 | BENZO(k)FLUORANTHENE | 480 | UG/KG | 0.48 | MG/KG | 0.0048 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB116 | DIBENZ(a,h)ANTHRACENE | 110 | UG/KG | 0.11 | MG/KG | 0.11 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB116 | INDENO(1,2,3-c,d)PYRENE | 300 | UG/KG | 0.3 | MG/KG | 0.03 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB116 | TEF CPAHs | -- | -- | -- | MG/KG | 0.80 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 6.4E-06 | 4.3E-06 | -- | 1.1E-05 | |
| | | | | | | | | | | | | | | | | | | | 4.9E-01 | 3.3E-06 | 3.3E-06 |

ROD Table 33

TABLE B.13.1
SURFACE SOIL SAMPL[obscured] OLLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH SITE - FOREST STREET INCINERATOR

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs -TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion Cancer | Adult + Child- Intake - Dermal - Cancer | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FSSB125 | ANTIMONY | 1.9 | MG/KG | 1.9 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 6.2E-02 | 1.2E-01 | -- | -- | 1.9E-01 | -- | |
| FSSB125 | ARSENIC | 8.1 | MG/KG | 8.1 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 3.5E-01 | 7.3E-03 | 1.3E-05 | 5.6E-07 | 3.6E-01 | 1.4E-05 | |
| FSSB125 | BARIUM | 680 | MG/KG | 680 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.3E-01 | 3.6E-02 | -- | -- | 1.6E-01 | -- | |
| FSSB125 | CHROMIUM, TOTAL | 13 | MG/KG | 13 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 5.6E-02 | 5.6E-02 | -- | -- | 1.1E-01 | -- | |
| FSSB125 | COPPER | 89 | MG/KG | 89 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 2.9E-02 | 2.9E-03 | -- | -- | 3.2E-02 | -- | |
| FSSB125 | LEAD | 660 | MG/KG | 660 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB125 | MANGANESE | 120 | MG/KG | 120 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 2.2E-02 | 8.9E-03 | -- | -- | 3.1E-02 | -- | |
| FSSB125 | MERCURY | | | | | | | | | | | | | | | | | | | | |
| FSSB125 | ZINC | 2000 | MG/KG | 2000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 8.7E-02 | 8.7E-03 | -- | -- | 9.5E-02 | -- | |
| FSSB125 | BENZO(a)ANTHRACENE | 370 | UG/KG | 0.37 | MG/KG | 0.037 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB125 | BENZO(a)PYRENE | 410 | UG/KG | 0.41 | MG/KG | 0.41 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB125 | BENZO(b)FLUORANTHENE | 440 | UG/KG | 0.44 | MG/KG | 0.044 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB125 | BENZO(k)FLUORANTHENE | 380 | UG/KG | 0.38 | MG/KG | 0.0038 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB125 | TEF CPAHs | -- | -- | -- | MG/KG | 0.49 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 4.0E-06 | 2.7E-06 | -- | 6.7E-06 | |
| FSSB125 | TEQ OF 2,3,7,8-TCDD | 2.8 | NG/KG | 0.000028 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 1.5E+05 | 3.0E+05 | -- | -- | 4.6E-06 | 3.6E-06 | -- | 8.2E-06 | |
| | | | | | | | | | | | | | | | | | | | 9.8E-01 | 2.9E-05 | 2.9E-05 |
| FSSB127 | ARSENIC | 1.3 | MG/KG | 1.3 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 5.6E-02 | 1.2E-03 | 2.1E-06 | 8.9E-08 | 5.7E-02 | 2.2E-06 | |
| FSSB127 | BARIUM | 150 | MG/KG | 150 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.8E-02 | 8.0E-03 | -- | -- | 3.6E-02 | -- | |
| FSSB127 | CHROMIUM, TOTAL | 8.9 | MG/KG | 8.9 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 3.9E-02 | 3.9E-02 | -- | -- | 7.7E-02 | -- | |
| FSSB127 | COPPER | 28 | MG/KG | 28 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 9.1E-03 | 9.1E-04 | -- | -- | 1.0E-02 | -- | |
| FSSB127 | LEAD | 270 | MG/KG | 270 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB127 | MANGANESE | 59 | MG/KG | 59 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.1E-02 | 4.4E-03 | -- | -- | 1.5E-02 | -- | |
| FSSB127 | | | | | | | | | | | | | | | | | | | | | |
| FSSB127 | ZINC | 410 | MG/KG | 410 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.8E-02 | 1.8E-03 | -- | -- | 2.0E-02 | -- | |
| FSSB127 | TEQ OF 2,3,7,8-TCDD | 3.3 | NG/KG | 0.000033 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 1.5E+05 | 3.0E+05 | -- | -- | 5.4E-06 | 4.3E-06 | -- | 9.7E-06 | |
| | | | | | | | | | | | | | | | | | | | 2.2E-01 | 1.2E-05 | 1.2E-05 |
| FSSB128 | ARSENIC | 1.4 | MG/KG | 1.4 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 6.1E-02 | 1.3E-03 | 2.3E-06 | 9.6E-08 | 6.2E-02 | 2.4E-06 | |
| FSSB128 | BARIUM | 79 | MG/KG | 79 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.5E-02 | 4.2E-03 | -- | -- | 1.9E-02 | -- | |
| FSSB128 | CHROMIUM, TOTAL | 8.4 | MG/KG | 8.4 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 3.6E-02 | 3.6E-02 | -- | -- | 7.3E-02 | -- | |
| FSSB128 | COPPER | 14 | MG/KG | 14 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 4.6E-03 | 4.6E-04 | -- | -- | 5.0E-03 | -- | |
| FSSB128 | LEAD | 240 | MG/KG | 240 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | | | | | | | |
| FSSB128 | MANGANESE | 31 | MG/KG | 31 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 5.8E-03 | 2.3E-03 | -- | -- | 8.1E-03 | -- | |
| FSSB128 | | | | | | | | | | | | | | | | | | | | | |
| FSSB128 | ZINC | 210 | MG/KG | 210 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 9.1E-03 | 9.1E-04 | -- | -- | 1.0E-02 | -- | |
| FSSB128 | BENZO(a)ANTHRACENE | 2700 | UG/KG | 2.7 | MG/KG | 0.27 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB128 | BENZO(a)PYRENE | 2700 | UG/KG | 2.7 | MG/KG | 2.7 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB128 | BENZO(b)FLUORANTHENE | 3600 | UG/KG | 3.6 | MG/KG | 0.36 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB128 | BENZO(k)FLUORANTHENE | 2900 | UG/KG | 2.9 | MG/KG | 0.029 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB128 | DIBENZ(a,h)ANTHRACENE | 720 | UG/KG | 0.72 | MG/KG | 0.72 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB128 | INDENO(1,2,3-c,d)PYRENE | 2200 | UG/KG | 2.2 | MG/KG | 0.22 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB128 | TEF CPAHs | -- | -- | -- | MG/KG | 4.30 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 3.5E-05 | 2.3E-05 | -- | 5.8E-05 | |
| | | | | | | | | | | | | | | | | | | | 1.8E-01 | 6.0E-05 | 6.0E-05 |

ROD Table 33

TABLE B.13.1
SURFACE SOIL SAMPLES COLLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH SITE - FOREST STREET INCINERATOR

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs -TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - Cancer | Adult + Child - Intake - Dermal - Cancer | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FSSB129 | ARSENIC | 2.6 | MG/KG | 2.6 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 1.1E-01 | 2.3E-03 | 4.3E-06 | 1.8E-07 | 1.1E-01 | 4.5E-06 | |
| FSSB129 | BARIUM | 100 | MG/KG | 100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.9E-02 | 5.3E-03 | -- | -- | 2.4E-02 | -- | |
| FSSB129 | CHROMIUM, TOTAL | 4.5 | MG/KG | 4.5 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 2.0E-02 | 2.0E-02 | -- | -- | 3.9E-02 | -- | |
| FSSB129 | COPPER | 18 | MG/KG | 18 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 5.9E-03 | 5.9E-04 | -- | -- | 6.4E-03 | -- | |
| FSSB129 | LEAD | 230 | MG/KG | 230 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB129 | MANGANESE | 47 | MG/KG | 47 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 8.7E-03 | 3.5E-03 | -- | -- | 1.2E-02 | -- | |
| FSSB129 | | | | | | | | | | | | | | | | | | | | | |
| FSSB129 | ZINC | 320 | MG/KG | 320 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.4E-02 | 1.4E-03 | -- | -- | 1.5E-02 | -- | |
| FSSB129 | BENZO(a)ANTHRACENE | 1300 | UG/KG | 1.3 | MG/KG | 0.13 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB129 | BENZO(a)PYRENE | 1400 | UG/KG | 1.4 | MG/KG | 1.4 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB129 | BENZO(b)FLUORANTHENE | 1600 | UG/KG | 1.6 | MG/KG | 0.16 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB129 | BENZO(k)FLUORANTHENE | 1200 | UG/KG | 1.2 | MG/KG | 0.012 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB129 | DIBENZ(a,h)ANTHRACENE | 330 | UG/KG | 0.33 | MG/KG | 0.33 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB129 | INDENO(1,2,3-c,d)PYRENE | 1000 | UG/KG | 1 | MG/KG | 0.1 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FSSB129 | TEF CPAHs | -- | -- | -- | MG/KG | 2.13 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 1.7E-05 | 1.2E-05 | -- | 2.9E-05 | |
| | | | | | | | | | | | | | | | | | | | 2.1E-01 | 3.3E-05 | 3.3E-05 |
| FSSB327 | ANTIMONY | 5.3 | MG/KG | 5.3 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 1.7E-01 | 3.4E-01 | -- | -- | 5.2E-01 | -- | |
| FSSB327 | ARSENIC | 65 | MG/KG | 65 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 2.8E+00 | 5.8E-02 | 1.1E-04 | 4.5E-06 | 2.9E+00 | 1.1E-04 | |
| FSSB327 | BARIUM | 900 | MG/KG | 900 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.7E-01 | 4.8E-02 | -- | -- | 2.1E-01 | -- | |
| FSSB327 | CHROMIUM, TOTAL | 180 | MG/KG | 180 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 7.8E-01 | 7.8E-01 | -- | -- | 1.6E+00 | -- | |
| FSSB327 | COPPER | 520 | MG/KG | 520 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 1.7E-01 | 1.7E-02 | -- | -- | 1.9E-01 | -- | |
| FSSB327 | LEAD | 1300 | MG/KG | 1300 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB327 | MANGANESE | 660 | MG/KG | 660 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.2E-01 | 4.9E-02 | -- | -- | 1.7E-01 | -- | |
| FSSB327 | | | | | | | | | | | | | | | | | | | | | |
| FSSB327 | ZINC | 2300 | MG/KG | 2300 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.0E-01 | 1.0E-02 | -- | -- | 1.1E-01 | -- | |
| | | | | | | | | | | | | | | | | | | | 5.6E+00 | 1.1E-04 | 1.1E-04 |
| FSSB360 | ANTIMONY | 2.4 | MG/KG | 2.4 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 7.8E-02 | 1.6E-01 | -- | -- | 2.3E-01 | -- | |
| FSSB360 | ARSENIC | 39 | MG/KG | 39 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 1.7E+00 | 3.5E-02 | 6.4E-05 | 2.7E-06 | 1.7E+00 | 6.7E-05 | |
| FSSB360 | BARIUM | 770 | MG/KG | 770 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.4E-01 | 4.1E-02 | -- | -- | 1.8E-01 | -- | |
| FSSB360 | CHROMIUM, TOTAL | 40 | MG/KG | 40 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 1.7E-01 | 1.7E-01 | -- | -- | 3.5E-01 | -- | |
| FSSB360 | COPPER | 310 | MG/KG | 310 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 1.0E-01 | 1.0E-02 | -- | -- | 1.1E-01 | -- | |
| FSSB360 | LEAD | 1600 | MG/KG | 1600 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB360 | MANGANESE | 240 | MG/KG | 240 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 4.5E-02 | 1.8E-02 | -- | -- | 6.2E-02 | -- | |
| FSSB360 | | | | | | | | | | | | | | | | | | | | | |
| FSSB360 | ZINC | 2500 | MG/KG | 2500 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.1E-01 | 1.1E-02 | -- | -- | 1.2E-01 | -- | |
| | | | | | | | | | | | | | | | | | | | 2.8E+00 | 6.7E-05 | 6.7E-05 |
| FSSB378 | ANTIMONY | 2.2 | MG/KG | 2.2 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 7.2E-02 | 1.4E-01 | -- | -- | 2.1E-01 | -- | |
| FSSB378 | ARSENIC | 8.5 | MG/KG | 8.5 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 3.7E-01 | 7.6E-03 | 1.4E-05 | 5.8E-07 | 3.8E-01 | 1.5E-05 | |
| FSSB378 | BARIUM | 360 | MG/KG | 360 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 6.7E-02 | 1.9E-02 | -- | -- | 8.6E-02 | -- | |
| FSSB378 | CHROMIUM, TOTAL | 23 | MG/KG | 23 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 1.0E-01 | 1.0E-01 | -- | -- | 2.0E-01 | -- | |
| FSSB378 | COPPER | 54 | MG/KG | 54 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 1.8E-02 | 1.8E-03 | -- | -- | 1.9E-02 | -- | |
| FSSB378 | LEAD | 2600 | MG/KG | 2600 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FSSB378 | MANGANESE | 250 | MG/KG | 250 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 4.6E-02 | 1.9E-02 | -- | -- | 6.5E-02 | -- | |
| FSSB378 | | | | | | | | | | | | | | | | | | | | | |
| FSSB378 | ZINC | 1100 | MG/KG | 1100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 4.8E-02 | 4.8E-03 | -- | -- | 5.2E-02 | -- | |
| | | | | | | | | | | | | | | | | | | | 1.0E+00 | 1.5E-05 | 1.5E-05 |

### 5.5.4.1.2 5th & Cleveland Incinerator

The maximum detected concentration of the 71 chemicals, that were detected in the 226 surface soil samples collected from the residential areas of the 5th & Cleveland Incinerator site in surface soil, was compared to the corresponding EPA Region 9 PRG. Based on this comparison, 25 chemicals were retained as COPCs in surface soil in the residential areas. COPCs included carcinogenic PAHs, dioxins, pesticides, and metals.

It was not feasible for the risk assessment to quantitatively evaluate exposure to surface soil from 226 locations (exposure units). Therefore, an attempt was made to identify the most highly contaminated samples so that risks and hazards could be estimated for these locations. The surface soil analytical data were reviewed to determine which locations had the highest numbers, concentrations, and toxicities (potencies) of chemicals. Based on this review, ten sample locations were selected for quantitative evaluation. A summary of carcinogenic risks and noncarcinogenic hazards resulting from exposure to each of the ten sample locations is discussed below.

Lead, one of the primary contaminants of concern at the 5th & Cleveland Incinerator site, was not included in the quantitative evaluation of risks. There are no toxicity criteria for lead; therefore, lead was evaluated qualitatively by comparing detected concentrations of this metal to EPA's residential soil screening level of 400 mg/kg. Six of the ten surface soil samples that were quantitatively evaluated had detected lead concentrations that exceeded 400 mg/kg. The lead concentrations in these six samples ranged from 470 mg/kg to 11,000 mg/kg. The remaining four samples had detected lead concentrations that were below 400 mg/kg. These concentrations ranged from 160 mg/kg to 369 mg/kg.

Nine of the ten surface soil samples evaluated as part of this assessment resulted in excess lifetime cancer risks that were within EPA's target risk range of $1 \times 10^{-6}$ to $1 \times 10^{-4}$. Exposure to one sample, resulted in an excess lifetime cancer risk ($3 \times 10^{-4}$) that was above the acceptable range. Exposure to two samples, each resulted in an excess lifetime cancer risk of $1 \times 10^{-4}$, which is at the upper end of the target risk range. Estimated cancer risks for the remaining seven samples ranged from $1 \times 10^{-5}$ to $7 \times 10^{-5}$.

Six of the ten samples generated hazard indices greater than 1. The hazard indices for these five samples ranged from 3 to 12. The hazard indices for the remaining four samples ranged from 0.3 to 0.8.

Table 34 presents the calculated risks and hazards at the ten surface soil samples that were quantitatively evaluated.

5 9 0118



TABLE B.13.1
SURFACE SOIL SAMPLES COLLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH - 5TH AND CLEVELAND

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake Dermal - Noncancer | Adult + Child - Intake - Ingestion - Cancer | Adult + Child- Intake -Dermal - Cancer | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FCSB136 | ALUMINUM | 3100 | MG/KG | 3100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 4.0E-02 | 8.1E-03 | -- | -- | 4.8E-02 | -- | |
| FCSB136 | ANTIMONY | 9.2 | MG/KG | 9.2 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 3.0E-01 | 6.0E-01 | -- | -- | 9.0E-01 | -- | |
| FCSB136 | ARSENIC | 20 | MG/KG | 20 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 8.7E-01 | 1.8E-02 | 3.3E-05 | 1.4E-06 | 8.8E-01 | 3.4E-05 | |
| FCSB136 | BARIUM | 650 | MG/KG | 650 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.2E-01 | 3.4E-02 | -- | -- | 1.6E-01 | -- | |
| FCSB136 | CHROMIUM, TOTAL | 38 | MG/KG | 38 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 1.6E-01 | 1.6E-01 | -- | -- | 3.3E-01 | -- | |
| FCSB136 | COPPER | 370 | MG/KG | 370 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 8.0E-03 | -- | -- | 4.8E-03 | 1.2E-02 | -- | -- | 1.7E-02 | -- | |
| FCSB136 | IRON | 64000 | MG/KG | 64000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 2.8E+00 | 3.7E-01 | -- | -- | 3.1E+00 | -- | |
| FCSB136 | LEAD | 5820 | MG/KG | 5820 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB136 | MANGANESE | 860 | MG/KG | 860 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.6E-01 | 6.4E-02 | -- | -- | 2.2E-01 | -- | |
| FCSB136 | ZINC | 2500 | MG/KG | 2500 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.1E-01 | 1.1E-02 | -- | -- | 1.2E-01 | -- | |
| FCSB136 | Heptachlor Epoxide | 1.7 | UG/KG | 0.0017 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB136 | BENZO(a)ANTHRACENE | 5300 | UG/KG | 5.3 | MG/KG | 0.53 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB136 | BENZO(a)PYRENE | 4300 | UG/KG | 4.3 | MG/KG | 4.3 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB136 | BENZO(b)FLUORANTHENE | 4000 | UG/KG | 4 | MG/KG | 0.4 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB136 | BENZO(k)FLUORANTHENE | 4100 | UG/KG | 4.1 | MG/KG | 0.041 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB136 | DIBENZ(a,h)ANTHRACENE | 930 | UG/KG | 0.93 | MG/KG | 0.93 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB136 | INDENO(1,2,3-c,d)PYRENE | 2700 | UG/KG | 2.7 | MG/KG | 0.27 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB136 | TEF CPAHs | -- | -- | -- | MG/KG | 6.47 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 5.2E-05 | 3.5E-05 | -- | 8.7E-05 | |
| | | | | | | | | | | | | | | | | | | | 5.8E+00 | 1.2E-04 | 1.2E-04 |
| FCSB073 | ALUMINUM | 740 | MG/KG | 740 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 9.6E-03 | 1.9E-03 | -- | -- | 1.2E-02 | -- | |
| FCSB073 | ANTIMONY | 1.7 | MG/KG | 1.7 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 5.5E-02 | 1.1E-01 | -- | -- | 1.7E-01 | -- | |
| FCSB073 | ARSENIC | 1.6 | MG/KG | 1.6 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 6.9E-02 | 1.4E-03 | 2.6E-06 | 1.1E-07 | 7.1E-02 | 2.8E-06 | |
| FCSB073 | BARIUM | 86 | MG/KG | 86 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.6E-02 | 4.6E-03 | -- | -- | 2.1E-02 | -- | |
| FCSB073 | CHROMIUM, TOTAL | 4.8 | MG/KG | 4.8 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 2.1E-02 | 2.1E-02 | -- | -- | 4.2E-02 | -- | |
| FCSB073 | COPPER | 32 | MG/KG | 32 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 1.0E-02 | 1.0E-03 | -- | -- | 1.1E-02 | -- | |
| FCSB073 | IRON | 3900 | MG/KG | 3900 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 1.7E-01 | 2.3E-02 | -- | -- | 1.9E-01 | -- | |
| FCSB073 | LEAD | 369 | MG/KG | 369 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB073 | MANGANESE | 33 | MG/KG | 33 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 6.1E-03 | 2.5E-03 | -- | -- | 8.6E-03 | -- | |
| FCSB073 | ZINC | 280 | MG/KG | 280 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.2E-02 | 1.2E-03 | -- | -- | 1.3E-02 | -- | |
| FCSB073 | ALPHA-CHLORDANE | 2300 | UG/KG | 2.3 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-04 | 2.5E-04 | 3.50E-01 | 7.00E+01 | 6.0E-02 | 2.4E-02 | 8.9E-07 | 6.9E-05 | 8.4E-02 | 7.0E-05 | |
| FCSB073 | GAMMA-CHLORDANE | 5300 | UG/KG | 5.3 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-04 | 2.5E-04 | 3.50E-01 | 7.00E+01 | 1.4E-01 | 5.5E-02 | 2.0E-06 | 1.6E-04 | 1.9E-01 | 1.6E-04 | |
| FCSB073 | HEPTACHLOR | 1800 | UG/KG | 1.8 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-04 | 2.5E-04 | 4.5E+00 | 9.0E+00 | 4.7E-02 | 1.9E-02 | 8.9E-06 | 7.0E-06 | 6.6E-02 | 1.6E-05 | |
| FCSB073 | HEPTACHLOR EPOXIDE | 1400 | UG/KG | 1.4 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 1.3E-05 | 6.5E-06 | 9.10E+00 | 1.82E+01 | 1.4E+00 | 5.6E-01 | 1.4E-05 | 1.1E-05 | 2.0E+00 | 2.5E-05 | |
| FCSB073 | BENZO(a)ANTHRACENE | 46 | UG/KG | 0.046 | MG/KG | 0.0046 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB073 | BENZO(a)PYRENE | 82 | UG/KG | 0.082 | MG/KG | 0.082 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB073 | BENZO(b)FLUORANTHENE | 51 | UG/KG | 0.051 | MG/KG | 0.0051 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB073 | BENZO(k)FLUORANTHENE | 81 | UG/KG | 0.081 | MG/KG | 0.00081 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB073 | TEF CPAHs | -- | -- | -- | MG/KG | 0.09 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 7.4E-07 | 5.0E-07 | -- | 1.2E-06 | |
| | | | | | | | | | | | | | | | | | | | 2.8E+00 | 2.8E-04 | 2.8E-04 |

ROD Table 34

TABLE [illegible]
SURFACE SOIL SAMPLES COLLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH - 5TH AND CLEVELAND

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - Cancer | Adult + Child- Intake -Dermal - Cancer | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FCSB064 | ALUMINUM | 11000 | MG/KG | 11000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 1.4E-01 | 2.9E-02 | -- | -- | 1.7E-01 | -- | |
| FCSB064 | ANTIMONY | 15 | MG/KG | 15 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 4.9E-01 | 9.8E-01 | -- | -- | 1.5E+00 | -- | |
| FCSB064 | ARSENIC | 15 | MG/KG | 15 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 6.5E-01 | 1.3E-02 | 2.5E-05 | 1.0E-06 | 6.6E-01 | 2.6E-05 | |
| FCSB064 | BARIUM | 865 | MG/KG | 865 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.6E-01 | 4.6E-02 | -- | -- | 2.1E-01 | -- | |
| FCSB064 | CHROMIUM, TOTAL | 56 | MG/KG | 56 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 2.4E-01 | 2.4E-01 | -- | -- | 4.9E-01 | -- | |
| FCSB064 | COPPER | 735 | MG/KG | 735 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 2.4E-01 | 2.4E-02 | -- | -- | 2.6E-01 | -- | |
| FCSB064 | IRON | 37500 | MG/KG | 37500 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 1.6E+00 | 2.2E-01 | -- | -- | 1.8E+00 | -- | |
| FCSB064 | LEAD | 6190 | MG/KG | 6190 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB064 | MANGANESE | 330 | MG/KG | 330 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 6.1E-02 | 2.5E-02 | -- | -- | 8.6E-02 | -- | |
| FCSB064 | ZINC | 3600 | MG/KG | 3600 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.6E-01 | 1.6E-02 | -- | -- | 1.7E-01 | -- | |
| | | | | | | | | | | | | | | | | | | | 5.4E+00 | 2.6E-05 | 2.6E-05 |
| FCSB184 | ALUMINUM | 1400 | MG/KG | 1400 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 1.8E-02 | 3.6E-03 | -- | -- | 2.2E-02 | -- | |
| FCSB184 | ARSENIC | 0.75 | MG/KG | 0.75 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 3.3E-02 | 6.7E-04 | 1.2E-06 | 5.2E-08 | 3.3E-02 | 1.3E-06 | |
| FCSB184 | BARIUM | 180 | MG/KG | 180 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 3.3E-02 | 9.6E-03 | -- | -- | 4.3E-02 | -- | |
| FCSB184 | CHROMIUM, TOTAL | 7.8 | MG/KG | 7.8 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 3.4E-02 | 3.4E-02 | -- | -- | 6.8E-02 | -- | |
| FCSB184 | COPPER | 16 | MG/KG | 16 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 5.2E-03 | 5.2E-04 | -- | -- | 5.7E-03 | -- | |
| FCSB184 | IRON | 2900 | MG/KG | 2900 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 1.3E-01 | 1.7E-02 | -- | -- | 1.4E-01 | -- | |
| FCSB184 | LEAD | 266 | MG/KG | 266 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB184 | MANGANESE | 31 | MG/KG | 31 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 5.8E-03 | 2.3E-03 | -- | -- | 8.1E-03 | -- | |
| FCSB184 | ZINC | 280 | MG/KG | 280 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.2E-02 | 1.2E-03 | -- | -- | 1.3E-02 | -- | |
| FCSB184 | TEQ OF 2,3,7,8-TCDD | 29.6 | NG/KG | 0.0000296 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 1.5E+05 | 3.0E+05 | -- | -- | 4.9E-06 | 3.8E-06 | -- | 8.7E-06 | |
| | | | | | | | | | | | | | | | | | | | 3.4E-01 | 1.0E-05 | 1.0E-05 |

ROD Table 34

TABLE [illegible].1
SURFACE SOIL SAMPLES COLLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH - 5TH AND CLEVELAND

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake Dermal - Noncancer | Adult + Child - Intake - Ingestion - Cancer | Adult + Child- Intake -Dermal - Cancer | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FCSB185 | ALUMINUM | 1500 | MG/KG | 1500 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 2.0E-02 | 3.9E-03 | -- | -- | 2.3E-02 | -- | |
| FCSB185 | ANTIMONY | 0.55 | MG/KG | 0.55 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 1.8E-02 | 3.6E-02 | -- | -- | 5.4E-02 | -- | |
| FCSB185 | ARSENIC | 1.5 | MG/KG | 1.5 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 6.5E-02 | 1.3E-03 | 2.5E-06 | 1.0E-07 | 6.6E-02 | 2.6E-06 | |
| FCSB185 | BARIUM | 100 | MG/KG | 100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 1.9E-02 | 5.3E-03 | -- | -- | 2.4E-02 | -- | |
| FCSB185 | CHROMIUM, TOTAL | 6.2 | MG/KG | 6.2 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 2.7E-02 | 2.7E-02 | -- | -- | 5.4E-02 | -- | |
| FCSB185 | COPPER | 23 | MG/KG | 23 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 7.5E-03 | 7.5E-04 | -- | -- | 8.2E-03 | -- | |
| FCSB185 | IRON | 3100 | MG/KG | 3100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 1.3E-01 | 1.8E-02 | -- | -- | 1.5E-01 | -- | |
| FCSB185 | LEAD | 160 | MG/KG | 160 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB185 | MANGANESE | 47 | MG/KG | 47 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 8.7E-03 | 3.5E-03 | -- | -- | 1.2E-02 | -- | |
| FCSB185 | ZINC | 47 | MG/KG | 47 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 2.0E-03 | 2.0E-04 | -- | -- | 2.2E-03 | -- | |
| FCSB185 | BENZO(a)ANTHRACENE | 490 | UG/KG | 0.49 | MG/KG | 0.049 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB185 | BENZO(a)PYRENE | 600 | UG/KG | 0.6 | MG/KG | 0.6 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB185 | BENZO(b)FLUORANTHENE | 690 | UG/KG | 0.69 | MG/KG | 0.069 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB185 | BENZO(k)FLUORANTHENE | 540 | UG/KG | 0.54 | MG/KG | 0.0054 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB185 | DIBENZ(a,h)ANTHRACENE | 100 | UG/KG | 0.1 | MG/KG | 0.1 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB185 | INDENO(1,2,3-c,d)PYRENE | 410 | UG/KG | 0.41 | MG/KG | 0.041 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB185 | TEF CPAHs | -- | -- | -- | MG/KG | 0.86 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 6.9E-06 | 4.7E-06 | -- | 1.2E-05 | |
| FCSB185 | TEQ OF 2,3,7,8-TCDD | 9.0 | NG/KG | 0.000009 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 1.5E+05 | 3.0E+05 | -- | -- | 1.5E-06 | 1.2E-06 | -- | 2.6E-06 | |
| | | | | | | | | | | | | | | | | | | | 4.0E-01 | 1.7E-05 | 1.7E-05 |
| FCSB308 | ALUMINUM | 1600 | MG/KG | 1600 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 2.1E-02 | 4.2E-03 | -- | -- | 2.5E-02 | -- | |
| FCSB308 | ANTIMONY | 0.87 | MG/KG | 0.87 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 2.8E-02 | 5.7E-02 | -- | -- | 8.5E-02 | -- | |
| FCSB308 | ARSENIC | 2.3 | MG/KG | 2.3 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 1.0E-01 | 2.1E-03 | 3.8E-06 | 1.6E-07 | 1.0E-01 | 4.0E-06 | |
| FCSB308 | BARIUM | 140 | MG/KG | 140 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.6E-02 | 7.4E-03 | -- | -- | 3.3E-02 | -- | |
| FCSB308 | CHROMIUM, TOTAL | 9.7 | MG/KG | 9.7 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 4.2E-02 | 4.2E-02 | -- | -- | 8.4E-02 | -- | |
| FCSB308 | COPPER | 28 | MG/KG | 28 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 9.1E-03 | 9.1E-04 | -- | -- | 1.0E-02 | -- | |
| FCSB308 | IRON | 8200 | MG/KG | 8200 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 3.6E-01 | 4.7E-02 | -- | -- | 4.0E-01 | -- | |
| FCSB308 | LEAD | 290 | MG/KG | 290 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | | | | | | | |
| FCSB308 | MANGANESE | 140 | MG/KG | 140 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 2.6E-02 | 1.0E-02 | -- | -- | 3.6E-02 | -- | |
| FCSB308 | ZINC | 680 | MG/KG | 680 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 2.9E-02 | 2.9E-03 | -- | -- | 3.2E-02 | -- | |
| FCSB308 | CRESOLS, M&P | 73 | UG/KG | 0.073 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB308 | BENZO(a)ANTHRACENE | 7000 | UG/KG | 7 | MG/KG | 0.7 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB308 | BENZO(a)PYRENE | 6000 | UG/KG | 6 | MG/KG | 6 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB308 | BENZO(b)FLUORANTHENE | 6000 | UG/KG | 6 | MG/KG | 0.6 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB308 | BENZO(k)FLUORANTHENE | 4500 | UG/KG | 4.5 | MG/KG | 0.045 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB308 | DIBENZ(a,h)ANTHRACENE | 1200 | UG/KG | 1.2 | MG/KG | 1.2 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB308 | INDENO(1,2,3-c,d)PYRENE | 3800 | UG/KG | 3.8 | MG/KG | 0.38 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB308 | TEF CPAHs | -- | -- | -- | MG/KG | 8.93 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 7.2E-05 | 4.8E-05 | -- | 1.2E-04 | |
| | | | | | | | | | | | | | | | | | | | 8.1E-01 | 1.2E-04 | 1.2E-04 |

ROD Table 34

TABLE B.13.1
SURFACE SOIL SAMPLES COLLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH - 5TH AND CLEVELAND

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - Cancer | Adult + Child- Intake -Dermal - Cancer | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FCSB313 | ALUMINUM | 2000 | MG/KG | 2000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 2.6E-02 | 5.2E-03 | -- | -- | 3.1E-02 | -- | |
| FCSB313 | ANTIMONY | 0.84 | MG/KG | 0.84 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 2.7E-02 | 5.5E-02 | -- | -- | 8.2E-02 | -- | |
| FCSB313 | ARSENIC | 2 | MG/KG | 2 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 8.7E-02 | 1.8E-03 | 3.3E-06 | 1.4E-07 | 8.8E-02 | 3.4E-06 | |
| FCSB313 | BARIUM | 140 | MG/KG | 140 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.6E-02 | 7.4E-03 | -- | -- | 3.3E-02 | -- | |
| FCSB313 | CHROMIUM, TOTAL | 18 | MG/KG | 18 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 7.8E-02 | 7.8E-02 | -- | -- | 1.6E-01 | -- | |
| FCSB313 | COPPER | 68 | MG/KG | 68 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 2.2E-02 | 2.2E-03 | -- | -- | 2.4E-02 | -- | |
| FCSB313 | IRON | 6100 | MG/KG | 6100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 2.6E-01 | 3.5E-02 | -- | -- | 3.0E-01 | -- | |
| FCSB313 | LEAD | 470 | MG/KG | 470 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB313 | MANGANESE | 82 | MG/KG | 82 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.5E-02 | 6.1E-03 | -- | -- | 2.1E-02 | -- | |
| FCSB313 | ZINC | 520 | MG/KG | 520 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 2.3E-02 | 2.3E-03 | -- | -- | 2.5E-02 | -- | |
| FCSB313 | ALPHA-CHLORDANE | 5.9 | UG/KG | 0.0059 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-04 | 2.5E-04 | 3.5E-01 | 7.0E+01 | 1.5E-04 | 6.1E-05 | 2.3E-09 | 1.8E-07 | 2.1E-04 | 1.8E-07 | |
| FCSB313 | DIELDRIN | 4 | UG/KG | 0.004 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-05 | 2.5E-05 | 1.6E+01 | 3.2E+01 | 1.0E-03 | 4.2E-04 | 7.0E-08 | 5.5E-08 | 1.5E-03 | 1.3E-07 | |
| FCSB313 | GAMMA-CHLORDANE | 5.8 | UG/KG | 0.0058 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-04 | 2.5E-04 | 3.5E-01 | 7.0E+01 | 1.5E-04 | 6.0E-05 | 2.2E-09 | 1.7E-07 | 2.1E-04 | 1.8E-07 | |
| FCSB313 | HEPTACHLOR | 0.24 | UG/KG | 0.00024 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-04 | 2.5E-04 | 4.5E+00 | 9.0E+00 | 6.2E-06 | 2.5E-06 | 1.2E-09 | 9.3E-10 | 8.7E-06 | 2.1E-09 | |
| FCSB313 | HEPTACHLOR EPOXIDE | 0.75 | UG/KG | 0.00075 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 1.3E-05 | 6.5E-06 | 9.1E+00 | 1.82E+01 | 7.5E-04 | 3.0E-04 | 7.5E-09 | 5.9E-09 | 1.1E-03 | 1.3E-08 | |
| FCSB313 | BENZO(a)ANTHRACENE | 1700 | UG/KG | 1.7 | MG/KG | 0.17 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB313 | BENZO(a)PYRENE | 2100 | UG/KG | 2.1 | MG/KG | 2.1 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB313 | BENZO(b)FLUORANTHENE | 1300 | UG/KG | 1.3 | MG/KG | 0.13 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB313 | BENZO(k)FLUORANTHENE | 1600 | UG/KG | 1.6 | MG/KG | 0.016 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB313 | INDENO(1,2,3-c,d)PYRENE | 2200 | UG/KG | 2.2 | MG/KG | 0.22 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB313 | TEF CPAHs | -- | -- | -- | MG/KG | 2.64 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 2.1E-05 | 1.4E-05 | -- | 3.5E-05 | |
| | | | | | | | | | | | | | | | | | | | 7.6E-01 | 3.9E-05 | 3.9E-05 |
| FCSB370 | ALUMINUM | 4800 | MG/KG | 4800 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 6.2E-02 | 1.2E-02 | -- | -- | 7.5E-02 | -- | |
| FCSB370 | ANTIMONY | 46 | MG/KG | 46 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 1.5E+00 | 3.0E+00 | -- | -- | 4.5E+00 | -- | |
| FCSB370 | ARSENIC | 31 | MG/KG | 31 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 1.3E+00 | 2.8E-02 | 5.1E-05 | 2.1E-06 | 1.4E+00 | 5.3E-05 | |
| FCSB370 | BARIUM | 1100 | MG/KG | 1100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.0E-01 | 5.8E-02 | -- | -- | 2.6E-01 | -- | |
| FCSB370 | CHROMIUM, TOTAL | 42 | MG/KG | 42 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 1.8E-01 | 1.8E-01 | -- | -- | 3.6E-01 | -- | |
| FCSB370 | COPPER | 580 | MG/KG | 580 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 1.9E-01 | 1.9E-02 | -- | -- | 2.1E-01 | -- | |
| FCSB370 | IRON | 76000 | MG/KG | 76000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 3.3E+00 | 4.4E-01 | -- | -- | 3.7E+00 | -- | |
| FCSB370 | LEAD | 4000 | MG/KG | 4000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB370 | MANGANESE | 830 | MG/KG | 830 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.5E-01 | 6.2E-02 | -- | -- | 2.2E-01 | -- | |
| FCSB370 | ZINC | 3300 | MG/KG | 3300 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.4E-01 | 1.4E-02 | -- | -- | 1.6E-01 | -- | |
| | | | | | | | | | | | | | | | | | | | 1.1E+01 | 5.3E-05 | 5.3E-05 |

TABL[illegible]
SURFACE SOIL SAMPLES COLLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH - 5TH AND CLEVELAND

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake Dermal - Noncancer | Adult + Child - Intake - Ingestion - Cancer | Adult + Child- Intake -Dermal - Cancer | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FCSB371 | ALUMINUM | 1900 | MG/KG | 1900 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 2.5E-02 | 4.9E-03 | -- | -- | 3.0E-02 | -- | |
| FCSB371 | ANTIMONY | 100 | MG/KG | 100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 3.3E+00 | 6.5E+00 | -- | -- | 9.8E+00 | -- | |
| FCSB371 | ARSENIC | 32 | MG/KG | 32 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 1.4E+00 | 2.9E-02 | 5.3E-05 | 2.2E-06 | 1.4E+00 | 5.5E-05 | |
| FCSB371 | BARIUM | 200 | MG/KG | 200 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 3.7E-02 | 1.1E-02 | -- | -- | 4.8E-02 | -- | |
| FCSB371 | CHROMIUM, TOTAL | 12 | MG/KG | 12 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 5.2E-02 | 5.2E-02 | -- | -- | 1.0E-01 | -- | |
| FCSB371 | COPPER | 68 | MG/KG | 68 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 2.2E-02 | 2.2E-03 | -- | -- | 2.4E-02 | -- | |
| FCSB371 | IRON | 15000 | MG/KG | 15000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 8.5E-01 | 8.7E-02 | -- | -- | 7.4E-01 | -- | |
| FCSB371 | LEAD | 11000 | MG/KG | 11000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| FCSB371 | MANGANESE | 110 | MG/KG | 110 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 2.0E-02 | 8.2E-03 | -- | -- | 2.9E-02 | -- | |
| FCSB371 | ZINC | 660 | MG/KG | 660 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 2.9E-02 | 2.9E-03 | -- | -- | 3.1E-02 | -- | |
| FCSB371 | BENZO(a)ANTHRACENE | 800 | UG/KG | 0.8 | MG/KG | 0.08 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB371 | BENZO(a)PYRENE | 720 | UG/KG | 0.72 | MG/KG | 0.72 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB371 | BENZO(b)FLUORANTHENE | 830 | UG/KG | 0.83 | MG/KG | 0.083 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB371 | BENZO(k)FLUORANTHENE | 690 | UG/KG | 0.69 | MG/KG | 0.0069 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB371 | DIBENZ(a,h)ANTHRACENE | 130 | UG/KG | 0.13 | MG/KG | 0.13 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB371 | INDENO(1,2,3-c,d)PYRENE | 450 | UG/KG | 0.45 | MG/KG | 0.045 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB371 | TEF CPAHs | -- | -- | -- | MG/KG | 1.06 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 8.6E-06 | 5.8E-06 | -- | 1.4E-05 | |
| | | | | | | | | | | | | | | | | | | | 1.2E+01 | 6.9E-05 | 6.9E-05 |
| FCSB375 | ALUMINUM | 1700 | MG/KG | 1700 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.0E+00 | 1.0E-01 | -- | -- | 2.2E-02 | 4.4E-03 | -- | -- | 2.7E-02 | -- | |
| FCSB375 | ANTIMONY | 12 | MG/KG | 12 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 3.9E-01 | 7.8E-01 | -- | -- | 1.2E+00 | -- | |
| FCSB375 | ARSENIC | 17 | MG/KG | 17 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 7.4E-01 | 1.5E-02 | 2.8E-05 | 1.2E-06 | 7.5E-01 | 2.9E-05 | |
| FCSB375 | BARIUM | 1500 | MG/KG | 1500 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.8E-01 | 8.0E-02 | -- | -- | 3.6E-01 | -- | |
| FCSB375 | CHROMIUM, TOTAL | 61 | MG/KG | 61 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 2.6E-01 | 2.6E-01 | -- | -- | 5.3E-01 | -- | |
| FCSB375 | COPPER | 170 | MG/KG | 170 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 5.5E-02 | 5.5E-03 | -- | -- | 6.1E-02 | -- | |
| FCSB375 | IRON | 31000 | MG/KG | 31000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 1.3E+00 | 1.8E-01 | -- | -- | 1.5E+00 | -- | |
| FCSB375 | LEAD | 3800 | MG/KG | 3800 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | | | | | | | |
| FCSB375 | MANGANESE | 310 | MG/KG | 310 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 5.8E-02 | 2.3E-02 | -- | -- | 8.1E-02 | -- | |
| FCSB375 | ZINC | 3800 | MG/KG | 3800 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 1.6E-01 | 1.6E-02 | -- | -- | 1.8E-01 | -- | |
| FCSB375 | ALPHA-CHLORDANE | 27 | UG/KG | 0.027 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-04 | 2.5E-04 | 3.5E-01 | 7.0E+01 | 7.0E-04 | 2.8E-04 | 1.0E-08 | 8.1E-07 | 9.8E-04 | 8.2E-07 | |
| FCSB375 | DIELDRIN | 6.8 | UG/KG | 0.0068 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-05 | 2.5E-05 | 1.6E+01 | 3.2E+01 | 1.8E-03 | 7.1E-04 | 1.2E-07 | 9.4E-08 | 2.5E-03 | 2.1E-07 | |
| FCSB375 | GAMMA-CHLORDANE | 22 | UG/KG | 0.022 | MG/KG | | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | 5.0E-04 | 2.5E-04 | 3.5E-01 | 7.0E+01 | 5.7E-04 | 2.3E-04 | 8.5E-09 | 6.6E-07 | 8.0E-04 | 6.7E-07 | |
| FCSB375 | BENZO(a)ANTHRACENE | 1200 | UG/KG | 1.2 | MG/KG | 0.12 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB375 | BENZO(a)PYRENE | 1000 | UG/KG | 1 | MG/KG | 1 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB375 | BENZO(b)FLUORANTHENE | 1300 | UG/KG | 1.3 | MG/KG | 0.13 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB375 | BENZO(k)FLUORANTHENE | 1100 | UG/KG | 1.1 | MG/KG | 0.011 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB375 | DIBENZ(a,h)ANTHRACENE | 360 | UG/KG | 0.36 | MG/KG | 0.36 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB375 | INDENO(1,2,3-c,d)PYRENE | 1100 | UG/KG | 1.1 | MG/KG | 0.11 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| FCSB375 | TEF CPAHs | -- | -- | -- | MG/KG | 1.73 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 1.4E-05 | 9.4E-06 | -- | 2.3E-05 | |
| | | | | | | | | | | | | | | | | | | | 4.7E+00 | 5.4E-05 | 5.4E-05 |

### 5.5.4.1.3 Lonnie C. Miller, Sr. Park

The maximum detected concentration of the 57 chemicals that were detected. in the 106 surface soil samples collected from the residential areas of the Lonnie C. Miller, Sr., Park site in surface soil, was compared to the corresponding EPA Region 9 PRG. Based on this comparison, 20 chemicals were retained as COPCs in surface soil in the residential areas. COPCs included carcinogenic PAHs, dioxins, and metals.

It was not feasible for the risk assessment to quantitatively evaluate exposure to surface soil from 106 locations (exposure units). Therefore, an attempt was made to identify the most highly contaminated samples so that risks and hazards could be estimated for these locations. The surface soil analytical data were reviewed to determine which locations had the highest numbers and detected concentrations of chemicals. Based on this review, ten sample locations were selected for quantitative evaluation The samples were collected from various yards and blocks of land around the site. A summary of carcinogenic risks and noncarcinogenic hazards resulting from exposure to each of the ten sample locations is discussed below.

Lead, one of the primary contaminants of concern at the Lonnie C. Miller, Sr., Park site, was not included in the quantitative evaluation of risks. There are no toxicity criteria for lead; therefore, lead was evaluated qualitatively by comparing detected concentrations of this metal to EPA's residential soil screening level of 400 mg/kg. Six of the ten surface soil samples that were quantitatively evaluated had detected lead concentrations that exceeded 400 mg/kg. The lead concentrations in these six samples ranged from 480 mg/kg to 990 mg/kg. The remaining four samples had detected lead concentrations that were below 400 mg/kg. These concentrations ranged from 35.9 mg/kg to 320 mg/kg.

With the exception of two samples, all surface soil samples evaluated as part of this quantitative assessment resulted in excess lifetime cancer risks that were within EPA's target risk range of $1 \times 10^{-6}$ to $1 \times 10^{-4}$. Exposure to one sample resulted in an excess lifetime cancer risk of only $8 \times 10^{-7}$. Exposure to one sample resulted in an excess lifetime cancer risk of $3 \times 10^{-4}$, which is slightly above the upper end of the target risk range. Estimated cancer risks for the remaining eight samples ranged from $2 \times 10^{-6}$ to $9 \times 10^{-5}$.

Six of the ten samples generated hazard indices greater than 1. The hazard indices for these samples ranged from 3 to 13. The hazard indices for the remaining four samples ranged from 0.03 to 1.

Table 35 presents the calculated risks and hazards at the ten surface soil samples that were quantitatively evaluated.

TAB
SURFACE SOIL SAMPLE LLECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH SITE - LONNIE C. MILLER

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - | Adult + Child- Intake - Dermal - | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LMSB094 | ARSENIC | 0.74 | MG/KG | 0.74 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 3.2E-02 | 6.6E-04 | 1.2E-06 | 5.1E-08 | 3.3E-02 | 1.3E-06 | |
| LMSB094 | BENZO(a)ANTHRACENE | 42 | UG/KG | 0.042 | MG/KG | 0.004 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB094 | BENZO(a)PYRENE | 36 | UG/KG | 0.036 | MG/KG | 0.036 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB094 | BENZO(b)FLUORANTHENE | 47 | UG/KG | 0.047 | MG/KG | 0.005 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB094 | BENZO(k)FLUORANTHENE | 34 | UG/KG | 0.034 | MG/KG | 3E-04 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB094 | CHRYSENE | 45 | UG/KG | 0.045 | MG/KG | 5E-04 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB094 | TEF CPAHs | -- | -- | -- | MG/KG | 0.05 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 4.0E-07 | 2.7E-07 | -- | 6.7E-07 | |
| | | | | | | | | | | | | | | | | | | | 3.3E-02 | 2.0E-06 | 2.0E-06 |
| LMSB321 | BENZO(a)ANTHRACENE | 45 | UG/KG | 0.045 | MG/KG | 0.005 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB321 | BENZO(a)PYRENE | 50 | UG/KG | 0.05 | MG/KG | 0.05 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB321 | BENZO(b)FLUORANTHENE | 49 | UG/KG | 0.049 | MG/KG | 0.005 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB321 | BENZO(k)FLUORANTHENE | 49 | UG/KG | 0.049 | MG/KG | 5E-04 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB321 | CHRYSENE | 52 | UG/KG | 0.052 | MG/KG | 5E-04 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB321 | TEF CPAHs | -- | -- | -- | MG/KG | 0.06 | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 4.9E-07 | 3.3E-07 | -- | 8.1E-07 | |
| | | | | | | | | | | | | | | | | | | | 0.0E+00 | 8.1E-07 | 8.1E-07 |

ROD Table 35

TABL
SURFACE SOIL SAMPLE LECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH SITE - LONNIE C. MILLER

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - | Adult + Child- Intake - Dermal - | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LMSB324 | ARSENIC | 0.64 | MG/KG | 0.64 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 2.8E-02 | 5.7E-04 | 1.1E-06 | 4.4E-08 | 2.8E-02 | 1.1E-06 | |
| LMSB324 | IRON | 2500 | MG/KG | 2500 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 1.1E-01 | 1.4E-02 | -- | -- | 1.2E-01 | -- | |
| LMSB324 | **BENZO(a)ANTHRACENE** | 85.5 | UG/KG | 0.0855 | MG/KG | **0.009** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB324 | **BENZO(a)PYRENE** | 140 | UG/KG | 0.14 | MG/KG | **0.14** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB324 | **BENZO(b)FLUORANTHENE** | 140 | UG/KG | 0.14 | MG/KG | **0.014** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB324 | **BENZO(k)FLUORANTHENE** | 120 | UG/KG | 0.12 | MG/KG | **0.001** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB324 | **INDENO(1,2,3-c,d)PYRENE** | 77 | UG/KG | 0.077 | MG/KG | **0.008** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB324 | **CHRYSENE** | 105 | UG/KG | 0.105 | MG/KG | **1E-04** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB324 | TEF CPAHs | -- | -- | -- | MG/KG | **0.17** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 1.4E-06 | 9.3E-07 | -- | 2.3E-06 | |
| | | | | | | | | | | | | | | | | | | | 1.5E-01 | 3.4E-06 | 3.4E-06 |
| LMSB339 | ALUMINUM | 9100 | MG/KG | 9100 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.00E+00 | 1.00E-01 | -- | -- | 1.2E-01 | 2.4E-02 | -- | -- | 1.4E-01 | -- | |
| LMSB339 | ANTIMONY | 6.3 | MG/KG | 6.3 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 2.0E-01 | 4.1E-01 | -- | -- | 6.1E-01 | -- | |
| LMSB339 | ARSENIC | 22 | MG/KG | 22 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-004 | 1.5E+00 | 1.6E+00 | 9.5E-01 | 2.0E-02 | 3.6E-05 | 1.5E-06 | 9.7E-01 | 3.8E-05 | |
| LMSB339 | BARIUM | 490 | MG/KG | 490 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 9.1E-02 | 2.6E-02 | -- | -- | 1.2E-01 | -- | |
| LMSB339 | CADMIUM | 23 | MG/KG | 23 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 5.0E-04 | 2.5E-05 | -- | -- | 6.0E-01 | 2.4E-01 | -- | -- | 8.4E-01 | -- | |
| LMSB339 | CHROMIUM, TOTAL | 110 | MG/KG | 110 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 4.8E-01 | 4.8E-01 | -- | -- | 9.5E-01 | -- | |
| LMSB339 | COPPER | 430 | MG/KG | 430 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 1.4E-01 | 1.4E-02 | -- | -- | 1.5E-01 | -- | |
| LMSB339 | IRON | 69000 | MG/KG | 69000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 3.0E+00 | 4.0E-01 | -- | -- | 3.4E+00 | -- | |
| LMSB339 | LEAD | 900 | MG/KG | 900 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| LMSB339 | MANGANESE | 590 | MG/KG | 590 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.1E-01 | 4.4E-02 | -- | -- | 1.5E-01 | -- | |
| LMSB339 | ZINC | 16000 | MG/KG | 16000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 6.0E-02 | -- | -- | 6.9E-01 | 6.9E-02 | -- | -- | 7.6E-01 | -- | |
| | | | | | | | | | | | | | | | | | | | 8.0E+00 | 3.8E-05 | 3.8E-05 |

ROD Table 35

TABL[...]
SURFACE SOIL SAMPL[...]ECTED IN YARDS
CANCER RISK AND HAZ[...] CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH SITE - LONNIE C. MILLER

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - | Adult + Child- Intake - Dermal - | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LMSB340 | ANTIMONY | 15 | MG/KG | 15 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 4.9E-01 | 9.8E-01 | -- | -- | 1.5E+00 | -- | |
| LMSB340 | ARSENIC | 52 | MG/KG | 52 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 2.3E+00 | 4.7E-02 | 8.6E-05 | 3.6E-06 | 2.3E+00 | 8.9E-05 | |
| LMSB340 | BARIUM | 230 | MG/KG | 230 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 4.3E-02 | 1.2E-02 | -- | -- | 5.5E-02 | -- | |
| LMSB340 | CHROMIUM, TOTAL | 61 | MG/KG | 61 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 2.6E-01 | 2.6E-01 | -- | -- | 5.3E-01 | -- | |
| LMSB340 | COPPER | 1500 | MG/KG | 1500 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 4.9E-01 | 4.9E-02 | -- | -- | 5.4E-01 | -- | |
| LMSB340 | IRON | 2E+05 | MG/KG | 160000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 6.9E+00 | 9.2E-01 | -- | -- | 7.9E+00 | -- | |
| LMSB340 | LEAD | 935 | MG/KG | 935 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| LMSB340 | MANGANESE | 750 | MG/KG | 750 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.4E-01 | 5.6E-02 | -- | -- | 2.0E-01 | -- | |
| | | | | | | | | | | | | | | | | | | | 1.3E+01 | 8.9E-05 | 8.9E-05 |
| LMSB343 | ANTIMONY | 3.1 | MG/KG | 3.1 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 1.0E-01 | 2.0E-01 | -- | -- | 3.0E-01 | -- | |
| LMSB343 | ARSENIC | 7.8 | MG/KG | 7.8 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 3.4E-01 | 7.0E-03 | 1.3E-05 | 5.4E-07 | 3.4E-01 | 1.3E-05 | |
| LMSB343 | BARIUM | 140 | MG/KG | 140 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.6E-02 | 7.4E-03 | -- | -- | 3.3E-02 | -- | |
| LMSB343 | CADMIUM | 1.9 | MG/KG | 1.9 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 5.0E-04 | 2.5E-05 | -- | -- | 4.9E-02 | 2.0E-02 | -- | -- | 6.9E-02 | -- | |
| LMSB343 | CHROMIUM, TOTAL | 25 | MG/KG | 25 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 1.1E-01 | 1.1E-01 | -- | -- | 2.2E-01 | -- | |
| LMSB343 | COPPER | 320 | MG/KG | 320 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 1.0E-01 | 1.0E-02 | -- | -- | 1.1E-01 | -- | |
| LMSB343 | IRON | 40000 | MG/KG | 40000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 1.7E+00 | 2.3E-01 | -- | -- | 2.0E+00 | -- | |
| LMSB343 | LEAD | 702 | MG/KG | 702 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | | | | | | | |
| LMSB343 | MANGANESE | 300 | MG/KG | 300 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 5.6E-02 | 2.2E-02 | -- | -- | 7.8E-02 | -- | |
| | | | | | | | | | | | | | | | | | | | 3.2E+00 | 1.3E-05 | 1.3E-05 |

ROD Table 35

TABLE
SURFACE SOIL SAMPLE CTED IN YARDS
CANCER RISK AND HAZ CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH SITE - LONNIE C. MILLER

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - | Adult + Child- Intake - Dermal - | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LMSB344 | ANTIMONY | 13 | MG/KG | 13 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 4.2E-01 | 8.5E-01 | -- | -- | 1.3E+00 | -- | |
| LMSB344 | ARSENIC | 57 | MG/KG | 57 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 2.5E+00 | 5.1E-02 | 9.4E-05 | 3.9E-06 | 2.5E+00 | 9.8E-05 | |
| LMSB344 | BARIUM | 130 | MG/KG | 130 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.4E-02 | 6.9E-03 | -- | -- | 3.1E-02 | -- | |
| LMSB344 | CADMIUM | 6 | MG/KG | 6 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 5.0E-04 | 2.5E-05 | -- | -- | 1.6E-01 | 6.2E-02 | -- | -- | 2.2E-01 | -- | |
| LMSB344 | CHROMIUM, TOTAL | 38 | MG/KG | 38 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 1.6E-01 | 1.6E-01 | -- | -- | 3.3E-01 | -- | |
| LMSB344 | COPPER | 220 | MG/KG | 220 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 7.2E-02 | 7.2E-03 | -- | -- | 7.9E-02 | -- | |
| LMSB344 | IRON | 47000 | MG/KG | 47000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 2.0E+00 | 2.7E-01 | -- | -- | 2.3E+00 | -- | |
| LMSB344 | LEAD | 700 | MG/KG | 700 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| LMSB344 | MANGANESE | 460 | MG/KG | 460 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 8.5E-02 | 3.4E-02 | -- | -- | 1.2E-01 | -- | |
| LMSB344 | VANADIUM | 43 | MG/KG | 43 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-03 | 1.4E-03 | -- | -- | 8.0E-02 | 8.0E-03 | -- | -- | 8.8E-02 | -- | |
| LMSB344 | **BENZO(a)ANTHRACENE** | 10000 | UG/KG | 10 | MG/KG | **1** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB344 | **BENZO(a)PYRENE** | 7800 | UG/KG | 7.8 | MG/KG | **7.8** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB344 | **BENZO(b)FLUORANTHENE** | 9600 | UG/KG | 9.6 | MG/KG | **0.96** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB344 | **BENZO(k)FLUORANTHENE** | 4900 | UG/KG | 4.9 | MG/KG | **0.049** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB344 | **CHRYSENE** | 9300 | UG/KG | 9.3 | MG/KG | **0.093** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB344 | **DIBENZ(a,h)ANTHRACENE** | 2300 | UG/KG | 2.3 | MG/KG | **2.3** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB344 | **INDENO(1,2,3-c,d)PYRENE** | 5700 | UG/KG | 5.7 | MG/KG | **0.57** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | |
| LMSB344 | TEF CPAHs | -- | -- | -- | MG/KG | **12.77** | 1.3E-05 | 2.6E-06 | 1.1E-06 | 4.3E-07 | -- | -- | 7.3E+00 | 1.26E+01 | -- | -- | 1.0E-04 | 6.9E-05 | -- | 1.7E-04 | |
| | | | | | | | | | | | | | | | | | | | 7.0E+00 | 2.7E-04 | 2.7E-04 |
| LMSB346 | ARSENIC | 2.8 | MG/KG | 2.8 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 1.2E-01 | 2.5E-03 | 4.6E-06 | 1.9E-07 | 1.2E-01 | 4.8E-06 | |
| LMSB346 | BARIUM | 140 | MG/KG | 140 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 2.6E-02 | 7.4E-03 | -- | -- | 3.3E-02 | -- | |
| LMSB346 | COPPER | 720 | MG/KG | 720 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 2.3E-01 | 2.3E-02 | -- | -- | 2.6E-01 | -- | |
| LMSB346 | IRON | 8800 | MG/KG | 8800 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 3.8E-01 | 5.1E-02 | -- | -- | 4.3E-01 | -- | |
| LMSB346 | MANGANESE | 270 | MG/KG | 270 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 5.0E-02 | 2.0E-02 | -- | -- | 7.0E-02 | -- | |
| LMSB346 | VANADIUM | 24 | MG/KG` | 24 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-03 | 1.4E-03 | -- | -- | 4.5E-02 | 4.5E-03 | -- | -- | 4.9E-02 | -- | |
| | | | | | | | | | | | | | | | | | | | 9.6E-01 | 4.8E-06 | 4.8E-06 |

ROD Table 35

TABLE [illegible]
SURFACE SOIL SAMPLES [illegible]ECTED IN YARDS
CANCER RISK AND HAZARD CALCULATIONS
CHILD AND ADULT
JACKSONVILLE ASH SITE - LONNIE C. MILLER

| Station ID | Compound | Final Result Used | Units | EPC | Units | CPAHs - TEF | Child - Intake - Ingestion - Noncancer | Child - Intake - Dermal - Noncancer | Adult + Child - Intake - Ingestion - | Adult + Child- Intake - Dermal - | Reference Dose - Oral | Reference Dose - Dermal | Slope Factor - Oral | Slope Factor - Dermal | Child Hazard - Ingestion | Child Hazard Dermal | Adult + Child Risk - Ingestion | Adult + Child Risk Dermal | Total Child Hazard | Total Adult + Child Risk | Total Lifetime Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LMSB347 | ALUMINUM | 8700 | MG/KG | 8700 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 1.00E+00 | 1.00E-01 | -- | -- | 1.1E-01 | 2.3E-02 | -- | -- | 1.4E-01 | -- | |
| LMSB347 | ANTIMONY | 3.4 | MG/KG | 3.4 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 1.1E-01 | 2.2E-01 | -- | -- | 3.3E-01 | -- | |
| LMSB347 | ARSENIC | 44 | MG/KG | 44 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 1.9E+00 | 3.9E-02 | 7.3E-05 | 3.0E-06 | 1.9E+00 | 7.6E-05 | |
| LMSB347 | CADMIUM | 6.8 | MG/KG | 6.8 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 5.0E-04 | 2.5E-05 | -- | -- | 1.8E-01 | 7.1E-02 | -- | -- | 2.5E-01 | -- | |
| LMSB347 | CHROMIUM, TOTAL | 44 | MG/KG | 44 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 1.9E-01 | 1.9E-01 | -- | -- | 3.8E-01 | -- | |
| LMSB347 | COPPER | 420 | MG/KG | 420 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 1.4E-01 | 1.4E-02 | -- | -- | 1.5E-01 | -- | |
| LMSB347 | IRON | 61000 | MG/KG | 61000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 2.6E+00 | 3.5E-01 | -- | -- | 3.0E+00 | -- | |
| LMSB347 | LEAD | 990 | MG/KG | 990 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | |
| LMSB347 | MANGANESE | 790 | MG/KG | 790 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 1.5E-01 | 5.9E-02 | -- | -- | 2.1E-01 | -- | |
| LMSB347 | VANADIUM | 16 | MG/KG | 16 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-03 | 1.4E-03 | -- | -- | 3.0E-02 | 3.0E-03 | -- | -- | 3.3E-02 | -- | |
| | | | | | | | | | | | | | | | | | | | 6.4E+00 | 7.6E-05 | 7.6E-05 |
| LMSB348 | ANTIMONY | 3.8 | MG/KG | 3.8 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-04 | 4.0E-06 | -- | -- | 1.2E-01 | 2.5E-01 | -- | -- | 3.7E-01 | -- | |
| LMSB348 | ARSENIC | 12 | MG/KG | 12 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-04 | 2.9E-04 | 1.5E+00 | 1.6E+00 | 5.2E-01 | 1.1E-02 | 2.0E-05 | 8.3E-07 | 5.3E-01 | 2.1E-05 | |
| LMSB348 | BARIUM | 220 | MG/KG | 220 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 4.9E-03 | -- | -- | 4.1E-02 | 1.2E-02 | -- | -- | 5.3E-02 | -- | |
| LMSB348 | CADMIUM | 3.9 | MG/KG | 3.9 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 5.0E-04 | 2.5E-05 | -- | -- | 1.0E-01 | 4.1E-02 | -- | -- | 1.4E-01 | -- | |
| LMSB348 | CHROMIUM, TOTAL | 96 | MG/KG | 96 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-03 | 6.0E-05 | -- | -- | 4.2E-01 | 4.2E-01 | -- | -- | 8.3E-01 | -- | |
| LMSB348 | COPPER | 220 | MG/KG | 220 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 4.0E-02 | 8.0E-03 | -- | -- | 7.2E-02 | 7.2E-03 | -- | -- | 7.9E-02 | -- | |
| LMSB348 | IRON | 48000 | MG/KG | 48000 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 3.0E-01 | 4.5E-02 | -- | -- | 2.1E+00 | 2.8E-01 | -- | -- | 2.4E+00 | -- | |
| LMSB348 | LEAD | 480 | MG/KG | 480 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | -- | -- | -- | -- | | | | | | | |
| LMSB348 | MANGANESE | 520 | MG/KG | 520 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-02 | 3.5E-03 | -- | -- | 9.7E-02 | 3.9E-02 | -- | -- | 1.4E-01 | -- | |
| LMSB348 | VANADIUM | 27 | MG/KG | 27 | MG/KG | | 1.3E-05 | 2.6E-07 | 1.1E-06 | 4.3E-08 | 7.0E-03 | 1.4E-03 | -- | -- | 5.0E-02 | 5.0E-03 | -- | -- | 5.5E-02 | -- | |
| | | | | | | | | | | | | | | | | | | | 4.6E+00 | 2.1E-05 | 2.1E-05 |

### 5.5.4.2 Qualitative Evaluation of Surface Soil Risk in Residential Areas

#### 5.5.4.2.1 Forest Street Incinerator

As discussed in Part 5.5.4.1.1, it was not feasible to calculate risks for 220 exposure units; therefore, 210 surface soil sample locations were not included in the quantitative evaluation. Based on the reduced numbers of COPCs at these locations, it was anticipated that the total risk and hazard at each location would be less than the criteria of concern (i.e., cancer risk of 1 X $10^{-4}$ or HI of 1). However, the analytical data from each of these 210 locations were evaluated qualitatively by comparing the detected concentration of each COPC to its chemical-specific RGO. If the detected concentration of a chemical was greater than the RGO corresponding to an HQ of 1 or a cancer risk of 1 X $10^{-6}$, further action may be required at that sample location (e.g., additional sampling, soil removal).

Detected concentrations of COPCs in 181of the 210 samples were all below RGOs. However, a total of 39 surface soil samples contained COPC concentrations that exceeded at least one RGO. Lead was the only contaminant of concern in 19 samples (i.e., lead was the only COPC detected at a concentration that exceeded an RGO). Lead plus at least one other COC were detected in 13 surface soil samples. Seven surface soil samples contained detected concentrations of COPCs other than lead that exceeded at least one RGO (i.e., lead was detected at concentrations less than 400 mg/kg in these seven samples).

Detected concentrations of COPCs in the ten samples that were quantitatively evaluated were compared to their corresponding RGOs. Nine of the ten samples had detected concentrations of COPCs that exceeded at least one RGO. PAHs, lead and arsenic were the only COPCs that exceeded the RGOs. PAHs were the only COPCs detected above an RGO in five of the ten samples. PAHs were detected at concentrations ranging from 0.31 mg/kg to 7.8 mg/kg. Lead was detected at concentrations exceeding 400 mg/kg in each of the remaining four samples with detected concentrations above RGOs. Arsenic or PAHs were also detected at concentrations exceeding their corresponding RGOs in three of these samples. Arsenic was detected at concentrations of 39 mg/kg and 65 mg/kg in two samples. PAHs were detected at a concentration of 0.5 mg/kg in sample.

Lead, one of the primary contaminants of concern at the Forest Street Incinerator site, was analyzed at each of the surface sample locations. Lead was detected at concentrations between 200 and 400 mg/kg in 37 surface soil samples. Lead was detected at concentrations above the RGO of 400 mg/kg in 26 surface soil samples.

#### 5.5.4.2.2 5th & Cleveland Incinerator

As discussed in Part 5.5.4.1.2, it was not feasible to calculate risks for 226 exposure units; therefore, 216 surface soil sample locations were not included in the quantitative evaluation. Based on the reduced numbers of COPCs at these locations, it was anticipated that the total risk and hazard at each location would be less than the criteria of concern (i.e., cancer risk of 1 X $10^{-4}$ or HI of 1). However, the analytical data from each of these 216 locations were evaluated qualitatively by comparing the detected concentration of each COPC to its chemical-specific

RGO. If the detected concentration of a chemical was greater than the RGO corresponding to an HQ of 1 or a cancer risk of 1 X $10^{-6}$, further action may be required at that sample location (e.g., additional sampling, soil removal).

Detected concentrations of COPCs in 114 of the 216 samples were all below RGOs. However, a total of 102 surface soil samples contained COPC concentrations that exceeded at least one RGO. Lead was the only contaminant of concern in 65 samples (i.e., lead was the only COPC detected at a concentration that exceeded an RGO). Lead plus at least one other COC were detected in 28 surface soil samples (e.g., lead and PAHs were detected in one sample at concentrations that exceeded their respective RGOs). Nine surface soil samples contained detected concentrations of COPCs other than lead that exceeded at least one RGO (i.e., lead was detected at concentrations less than 400 mg/kg in these nine samples).

Detected concentrations of COPCs in the ten samples that were quantitatively evaluated were compared to their corresponding RGOs. Nine of the ten samples had detected concentrations of COPCs that exceeded at least one RGO (one sample did not contain any detected concentrations above RGOs). Lead, PAHs, and pesticides were the only COPCs that exceeded the RGOs. With the exception of three samples, lead was detected at concentrations exceeding 400 mg/kg in all samples containing PAHs or pesticides at concentrations above RGOs. PAHs were detected at concentrations of 0.86 mg/kg and 8.9 mg/kg in two samples. Lead was detected at concentrations below its RGO at both of these locations. Pesticides (including alpha-chlordane, gamma-chlordane, heptachlor, and heptachlor epoxide) were detected at concentrations ranging from 1.4 mg/kg to 5.3 mg/kg in one sample. Lead was detected at a concentration of 369 mg/kg in one sample. This sample concentration, which was screened using XRF, was just below the RGO of 400 mg/kg.

Lead, one of the primary contaminants of concern at the 5th & Cleveland Incinerator site, was analyzed at each of the surface sample locations. Lead was detected at concentrations between 200 and 400 mg/kg in over 40 surface soil samples. Lead was detected at concentrations above the RGO of 400 mg/kg in well over 60 surface soil samples.

#### 5.5.4.2.3 Lonnie Miller, Sr. Park

As discussed in Part 5.5.4.1.3, it was not feasible to calculate risks for 106 exposure units; therefore, 96 surface soil sample locations were not included in the quantitative evaluation. Based on the reduced numbers of COPCs at these locations, it was anticipated that the total risk and hazard at each location would be less than the criteria of concern (i.e., cancer risk of 1 X $10^{-4}$ or HI of 1). However, the analytical data from each of these 96 locations were evaluated qualitatively by comparing the detected concentration of each COPC to its chemical-specific RGO. If the detected concentration of a chemical was greater than the RGO corresponding to an HQ of 1 or a cancer risk of 1 X $10^{-6}$, further action may be required at that sample location (e.g., additional sampling, soil removal).

Detected concentrations of COPCs in 90 of the 96 samples were all below RGOs. However, six surface soil samples contained COPC concentrations that exceeded an RGO. Lead was the only contaminant of concern in five of the six samples (i.e., lead was the only COPC detected at a concentration that exceeded an RGO). One surface soil sample contained antimony at a detected concentration that exceeded its RGO.

Detected concentrations of COPCs in the ten samples that were quantitatively evaluated were compared to their corresponding RGOs. Seven of the ten samples had detected concentrations of COPCs that exceeded at least one RGO. PAHs, lead, and arsenic were the only COPCs that exceeded the RGOs. Lead was detected at concentrations exceeding 400 mg/kg in six of the seven samples with detected concentrations above RGOs. Arsenic was also detected at concentrations exceeding its corresponding RGO in three of these samples. Arsenic was detected at concentrations of 52 mg/kg, 57 mg/kg and 44 mg/kg in three samples. PAHs, detected at a concentration of 0.2 mg/kg, were the only COPCs detected above an RGO in one sample.

Lead, one of the primary contaminants of concern at the Lonnie C. Miller, Sr., Park site, was analyzed at each of the surface soil sample locations. Lead was detected at concentrations above the RGO of 400 mg/kg in eight surface soil samples.

#### 5.5.4.3 Qualitative Evaluation of Subsurface Soil Risk in Residential Areas

#### 5.5.4.3.1 Forest Street Incinerator

Subsurface soil in the residential areas was evaluated qualitatively since it is not currently available for direct contact. A total of 18 chemicals were retained as COPCs in subsurface soils in the residential area of the Forest Street site. COPCs included dioxins, carcinogenic PAHs, aroclor 1260, and metals.

The analytical data from each subsurface soil sample were compared to the chemical-specific RGOs for dioxins, carcinogenic PAHs, aroclor 1260, and metals. Dioxins were sampled and detected in one subsurface soil sample; however, the detected concentration of dioxins in this sample was below the EPA Region 4 RGO of 1 ug/kg. Carcinogenic PAHs were detected in all 12 samples that were analyzed. With the exception of one sample, all detected concentrations of carcinogenic PAHs were greater than 0.07 mg/kg, the RGO corresponding to a risk of $1 \times 10^{-6}$. The maximum detected concentration of benzo(a)pyrene was 5.3 mg/kg. Aroclor 1260 was detected in nine subsurface soil samples. One of the detected concentrations of aroclor 1260 (1 mg/kg) was greater than 0.26 mg/kg, the RGO corresponding to a risk of $1 \times 10^{-6}$.

Detected concentrations of seven of the metals that were retained as COPCs (arsenic, barium, cadmium, copper, manganese, vanadium, and zinc) were below the RGO corresponding to an HQ of 1. However, the lead, antimony and chromium were detected in subsurface soil at concentrations that exceeded the RGO corresponding to an HQ of 1.

With the exception of three sample locations, lead was detected at concentrations exceeding 400 mg/kg at each subsurface soil location where a chemical-specific RGO was exceeded. In other words, lead was detected at concentrations greater than 400 mg/kg in the sample where the detected concentration of aroclor 1260 exceeded its RGO, and in eight of 11 subsurface soil samples where CPAHs exceeded the RGO of 0.07 mg/kg. Lead was detected at concentrations greater than 400 mg/kg in both subsurface soil samples where antimony exceeded the RGO of 29 mg/kg and in the sample where the detected concentration of chromium exceeded the RGO of 211 mg/kg.

#### 5.5.4.3.2 5th & Cleveland Incinerator

Subsurface soil in the residential areas was evaluated qualitatively since it is not currently available for direct contact. A total of 21 chemicals were retained as COPCs in subsurface soils in the residential area. COPCs included dioxins, carcinogenic PAHs, dieldrin, and metals.

The analytical data from each subsurface soil sample were compared to the chemical-specific RGOs for dioxins, carcinogenic PAHs, dieldrin, and metals. Dioxins were sampled and detected in two subsurface soil samples. Detected concentrations of dioxins in both samples were below the EPA Region 4 RGO of 1 ug/kg. Carcinogenic PAHs were detected in the eleven samples. All detected concentrations of carcinogenic PAHs were greater than 0.07 mg/kg, the RGO corresponding to a risk of 1 X $10^{-6}$. The maximum detected concentration of benzo(a)pyrene was 3.5 mg/kg. Dieldrin was detected in five subsurface soil samples. One of the detected concentrations of dieldrin (0.056 mg/kg) was greater than 0.04 mg/kg, the RGO corresponding to a risk of 1 X $10^{-6}$.

Detected concentrations of eight of the metals that were retained as COPCs (aluminum, barium, cadmium, chromium, copper, manganese, vanadium, and zinc) were below the RGO corresponding to an HQ of 1. However, lead, antimony and arsenic were detected in subsurface soil at concentrations that exceeded the RGO corresponding to an HQ of 1.

With the exception of one sample, lead was detected at concentrations exceeding 400 mg/kg at each subsurface soil location where a chemical-specific RGO was exceeded. In other words, lead was detected at concentrations greater than 400 mg/kg in the sample where the detected concentration of dieldrin exceeded its RGO, and in 10 of 11 subsurface soil samples where CPAHs exceeded the RGO of 0.07 mg/kg. Lead was detected at concentrations greater than 400 mg/kg in all three subsurface soil samples where arsenic exceeded the RGO of 23 mg/kg and both samples where detected concentrations of antimony exceeded the RGO of 29 mg/kg.

#### 5.5.4.3.3 Lonnie Miller Park, Sr. Park

Subsurface soil in the residential areas was evaluated qualitatively since it is not currently available for direct contact. A total of 17 chemicals were retained as COPCs in subsurface soils in the residential area. COPCs included carcinogenic PAHs and metals.

The analytical data from each subsurface soil sample were compared to the chemical-specific RGOs for carcinogenic PAHs and various metals. Carcinogenic PAHs were detected in all four samples that were analyzed. With the exception of one sample, all detected concentrations of carcinogenic PAHs were greater than 0.07 mg/kg, the RGO corresponding to a risk of 1 X $10^{-6}$. The maximum detected concentration of benzo(a)pyrene was 0.8 mg/kg.

Detected concentrations of nine of the metals that were retained as COPCs (aluminum, antimony, arsenic, barium, cadmium, copper, lead, manganese, nickel, vanadium, and zinc) were below the RGO corresponding to an HQ of 1. However, lead and arsenic were detected in subsurface soil at concentrations that exceeded the RGO corresponding to an HQ of 1. With the exception of arsenic in one sample, lead was the only metal detected in subsurface soil samples at a concentration that exceeded a chemical-specific RGO.

### 5.5.5 Evaluation of Vegetables

To address questions regarding exposure to site-related COPCs via ingestion of homegrown vegetables, samples were collected on January 15, 2002, from three gardens located near the 5th and Cleveland portion of the Jacksonville Ash Superfund Alternative Site. Two surface soil samples and two vegetable samples were collected from each of the three gardens. The soil samples and vegetable samples were analyzed for lead, arsenic, antimony, and PAHs. Only lead was detected in the vegetables and each of the gardens represented a different level of soil lead contamination. Listed below are the maximum concentrations of lead in the garden soils and the maximum detected concentration of lead in the corresponding vegetable sample:

1. Garden 1: maximum soil lead concentration of 500 mg/kg with a maximum vegetable lead concentration of 0.16 mg/kg,
2. Garden 2: maximum soil lead concentration of 4,400 mg/kg with a maximum vegetable lead concentration of 0.28 mg/kg
3. Garden 3: maximum soil lead concentration of 73 mg/kg with a maximum vegetable lead concentration of 0.089 mg/kg,

The vegetables sampled were collard and/or mustard greens. These vegetables were chosen because of their availability and the fact that they were thought to represent the vegetables most likely to bioaccumulate lead, therefore providing the most conservative data available.

To determine if the lead levels detected would result in an unacceptable risk via ingestion of the vegetables, the IEUBK model was run using the maximum detected lead concentrations in the vegetables from each of the three gardens. The results of the IEUBK model conclude that under these circumstances the average blood lead level would only slightly increase even at the highest detected concentrations of lead in the greens. Based on the IEUBK results, it can be concluded that there is no unacceptable risks associated from ingestion of vegetables from gardens with soil lead concentrations less than 500 mg/kg. The two samples collected from the highest soil lead contamination location (maximum concentration of 4,400 mg/kg lead) showed a slight increase above acceptable levels via ingestion of vegetables, but it has already been determined by EPA that residential exposure to soils with lead concentrations of 4,400 mg/kg is unacceptable via direct contact to those soils.

In conclusion, based on the above data and references, the use of vegetable gardens with soil lead concentrations below or only slightly above EPA's recommended remedial goal of 400 mg/kg should not result in any significant increase in blood lead levels. Garden soil levels of lead significantly above 400 mg/kg may pose unacceptable risk with the risk potential increasing with increasing levels of soil lead. Regardless of the soil lead level, following good gardening and food preparation practices will lower risks.

### 5.6 Uncertainties in the Human Health Risk Assessment

Uncertainties in the BHHRA included several factors which are discussed in the following paragraphs.

### 5.6.1 Data Evaluation

The purpose of data evaluation is to determine which constituents, if any, are present at the site at concentrations requiring further investigation. The screening process used to select COPCs to evaluate in the BHHRA was intended to include all chemicals with concentrations high enough to be of concern for the protection of public health.

Uncertainty with respect to data evaluation can arise from many sources, such as the quality and quantity of the data used to characterize the site, the process used to select data to use in the risk assessment, and the statistical treatment of data.

Most of the lead soil samples at the Forest Street site were analyzed in the field by XRF. A percentage of the lead samples were also submitted to a laboratory for confirmatory analysis. Of the 156 Phase I RI soil samples at the Forest Street site that had both XRF and laboratory results, 18 percent (28 samples) had readings that were basically the same (e.g., the higher reading was no more than 10 percent higher than the lower reading). When a given sample had two results for lead, the laboratory results were higher than the XRF readings 59 percent of the time and the XRF readings were higher than the laboratory results 6 percent of the time. However, when the two results were different (i.e., the higher value was more than 10 percent higher than the lower value), the higher result was generally between 1.2 and 1.9 times greater than the lower number. In fact, 80 percent of the 128 samples with different results fell into this category. On average, laboratory results were approximately 1.33 times higher than XRF results. Therefore, XRF soil samples at the Forest Street site containing less than 300 mg/kg of lead would likely be less than 400 mg/kg if the results were confirmed by laboratory analysis.

Most of the lead soil samples at the 5th & Cleveland site were analyzed in the field by XRF. A percentage of the lead samples were also submitted to a laboratory for confirmatory analysis. Of the 145 Phase I RI soil samples at the 5th & Cleveland site that had both XRF and laboratory results, 19 percent (28 samples) had readings that were basically the same. When a given sample had two results for lead, the laboratory results were higher than the XRF readings 59 percent of the time and the XRF readings were higher than the laboratory results 22 percent of the time. When the two results were different, the higher result was generally between 1.1 and 1.9 times greater than the lower number. In fact, 74 percent of the 117 samples with different results fell into this category. On average, laboratory results were approximately 1.5 times higher than XRF results. Therefore, XRF soil samples at the 5th & Cleveland site containing less than 270 mg/kg of lead would likely be less than 400 mg/kg if the results were confirmed by laboratory analysis.

Most of the lead soil samples at the Lonnie C. Miller, Sr. Park site were analyzed in the field by XRF. A percentage of the lead samples were also submitted to a laboratory for confirmatory analysis. Of the 105 Phase I RI soil samples at the Lonnie C. Miller, Sr. Park site that had both XRF and laboratory results, 11 percent (12 samples) had readings that were basically the same (e.g., the higher reading was no more than 10 percent higher than the lower reading). When a given sample had two results for lead, the laboratory results were higher than the XRF readings 64 percent of the time and the XRF readings were higher than the laboratory results 25 percent of the time. However, when the two results were different (i.e., the higher value was more than 10 percent higher than the lower value), the higher result was generally between 1.2 and 1.9 times greater than the lower number. In fact, 60 percent of the 94 samples with different results fell into this category. On average, laboratory results were approximately 1.3 times higher than XRF results. Therefore, XRF soil samples at the Lonnie C. Miller, Sr. Park site containing less than 300 mg/kg of lead would likely be less than 400 mg/kg if the results were confirmed by laboratory analysis.

EPA further evaluated the Phase I RI XRF and laboratory data for soil lead. The evaluation indicated an error of 1.7 percent when XRF lead measurements under 200 mg/kg were compared with the corresponding lead laboratory measurement exceeding 400 mg/kg. Therefore, EPA anticipates a 98 percent confirmation rate that no soil sample with a concentration above 400 mg/kg is missed.

### 5.6.2 Exposure Pathways and Parameter

The exposure assumptions directly influence the calculated doses (daily intakes), and ultimately the risk calculations. For the most part, site-specific data were not available for this BHHRA; therefore, conservative default exposure assumptions were used in calculating exposure doses such as the selection of exposure routes and exposure factors (e.g., contact rate). In most cases, this uncertainty may overestimate the most probable realistic exposures and, therefore, may overestimate risk. This is appropriate when performing risk assessments of this type so that the risk managers can be reasonably assured that the public risks may not be underestimated, and so that risk assessments for different locations and scenarios can be compared.

In order to estimate a receptor's potential exposure at a site, it is necessary to determine the geographical location where the receptor is assumed to be exposed. Once the area of interest has been defined, the appropriate data can be selected and the exposure point concentration can be calculated. The primary source of uncertainty associated with estimating exposure point concentrations involves the statistical methods used to estimate these concentrations and the assumptions inherent in these statistical methods. Generally, an upper bound estimate of the mean concentration is used to represent the exposure point concentration instead of the measured mean concentration. This is done to account for the possibility that the true mean is higher than the measured mean because unsampled areas of the site may have higher constituent concentrations. Listed below are a few site-specific uncertainties which relate to the exposure point concentration (EPC) calculation.

- When data sets for a exposure unit contained less than 10 samples, the maximum detected concentration in that data set was used to represent the EPC for the exposure unit. This may result in an overestimation of risk.

- COPC concentrations in soil for future use were assumed to be the same as current concentrations, with no adjustment due to migration or degradation. This may overestimate dose.

- Surface soil and sediment data were evaluated separately and exposure to these media was assumed to be equal (i.e., the same exposure assumptions were used to evaluate both media). This will result in an overestimation of risk.

- Sediment data from the intermittent ditch were evaluated as surface soil and were assumed to be dry year round. This may result in an overestimation of risk.

Ideally, areas of exposure should be defined based on actual exposures or known behaviors of receptors at the site. Often, however, this information is unavailable. Lacking absolute knowledge about the behaviors of receptors at or near the site, it is necessary to make some assumptions. This risk assessment conservatively assumed that current and future use of the site is residential. Such assumptions add to the uncertainty in the BHHRA.

The reasonable maximum exposure concept was used to develop exposure doses in the current and future scenarios and is defined as the "maximum exposure that is reasonably expected to occur at the site" (EPA, 1989). Several variables that were used to determine the exposure dose for the reasonable maximum exposure were generally based on upper-bound (typically 90th percentile or greater) estimates. These are:

- Maximum detected concentration used to calculate the exposure dose.
- Exposure duration (ED) (upper-bound value).
- Intake/contact rate (IR).
- Exposure frequency (EF).

Therefore, the calculated exposure dose for any given chemical, which results from integration of these variables, typically represents an upper-bound probable exposure dose estimate. The use of these upperbound exposure parameters, coupled with conservative estimates of toxicity, will yield risk results that represent an upper-bound estimate of the occurrence of carcinogenic and noncarcinogenic health effects.

Generally, in order to present a range of possible exposure estimates, a central tendency risk describer is calculated in addition to the reasonable maximum exposure risk. In accordance with Region 4 policy, central tendency risk describers are included in the uncertainty sub-part of the risk characterization. The reasonable maximum exposure approach characterizes risk at the upper end of the risk distribution, while the central tendency approach characterizes either the arithmetic mean risk or the median risk. The inclusion of both reasonable maximum exposure and central tendency risk describers provides perspective for the risk manager. However, the National Contingency Plan (NCP) Section 300.430(d) states, "The reasonable maximum exposure estimates for future uses of the site will provide the basis for the development of protective exposure levels."

### 5.6.3 Toxicity Assessment

For a risk to exist, both significant exposure to the chemicals of potential concern and toxicity at these predicted exposure levels must exist. The toxicological uncertainties primarily relate to the methodology by which carcinogenic and noncarcinogenic criteria (i.e., CSFs and reference doses) are developed. In general, the methodology currently used to develop CSFs and reference doses is very conservative, and likely results in overestimation of human toxicity (EPA, 1989).

Recent toxicological studies performed by the National Toxicology Program (NTP, 2004a, b, c, d) suggest that dioxin and dioxin-like chemicals may be considerably less carcinogenic than EPA previously thought. California EPA used this recent data to develop an oral cancer slope factor for dioxin that is 40 fold lower than the value in EPA's draft dioxin reassessment (Cal-EPA, 2005; USEPA, 2003). In 2005, California EPA released a draft Public Health Goal for TCDD in water (Cal-EPA, 2005). In this document, an oral cancer slope factor of 2.6E-02 per ngTEQ/kg-day or 26,000 per mgTEQ/kg-day was derived by Monte Carlo analysis to combine cancer potency estimates across the various tumor sites.

In EPA's recent draft assessment (USEPA, 2003) for dioxin and dioxin-like chemicals, the agency estimates an upper bound on the lifetime risk of all cancers combined of 1.0E-03 per pgTEQ/kg-day, or 1,000,000 per mgTEQ/kg-day. This proposed upper-bound slope factor spans a range from 0.5 to 19 times greater than the previous upper bound estimate on cancer slope of 1.6E-04 per pgTEQ/kg-day (USEPA, 1985).

In light of the significant uncertainties surrounding the upper-bound cancer risk estimates, the USEPA Region 4 remedial program currently defaults to using the previous EPA upper-bound cancer slope factor in calculating lifetime excess cancer risk for dioxin and dioxin-like compounds. The agency's final choice of the appropriate upper-bound cancer risk estimate may change.

### 5.6.4 Risk Characterization

Ideally, areas of exposure should be defined based on actual exposures or known behaviors of receptors at the site. Often, however, as in the case of this risk assessment, this information is unavailable. Lacking absolute knowledge about the behaviors of receptors at or near the site, it was necessary to make some assumptions. This risk assessment made assumptions about exposure units (or areas) based on contaminant distribution and likely areas of exposure based on site features. Such assumptions will add to the uncertainty in the BHHRA.

Each complete exposure pathway concerns more than one contaminant. There are uncertainties associated with summing risks or hazard quotients for multiple substances in the risk characterization step. The assumption ignores the possibility of synergistic or antagonistic activities in the metabolism of the contaminants. This could result in over-or under-estimation of risk.

The potential risks developed for the Jacksonville Ash Site were directly related to COPCs detected in the environmental media at this site. No attempt was made to differentiate between the risk contributions from other sites and those being contributed from the Jacksonville Ash Site.

Because inorganic chemicals are naturally-occurring, metals are generally compared to site-specific background concentrations when selecting COPCs for a site. As described further in the HHBRA, in general, EPA excludes chemicals as COPCs if the maximum detected concentration of an inorganic chemical is less than two times the mean background concentration, the chemical is excluded as a COPC in that medium. Samples were collected during the RI field investigation to serve as background samples for the Jacksonville Ash Site. However, since the boundaries of the ash had not been delineated, inorganic compounds detected in soil were not screened against the background samples due to the uncertainty associated with obtaining "true" background samples from this area. Therefore, no metal was excluded as a COPC in soil based on a comparison with background. This may result in an overestimation of risk.

Soil lead concentrations greater than 400 mg/kg in residential areas are considered a potential health threat. However, the degree of threat depends on the bioavailability of the lead. The lead model applies default assumptions in estimating the bioavailability of lead; however, the bioavailability of lead at the Jacksonville Ash Site was not measured. Available blood lead data for children in the surrounding neighborhoods indicates that the Site bioavailability of lead at the may be low.

Aluminum and iron were identified as chemicals of concern at the site. The RfDs for both of these metals are provisional (interim) values, meaning that they have not gone through the verification necessary to be placed by EPA on IRIS or HEAST. Additional toxicological data would be needed in order to complete this verification process. For example, the oral RfD for iron was derived from the mean dietary iron intakes, dietary plus supplemental, taken from the National Health and Nutrition Examination Survey (NHANES) II data base. Chromium was also identified as a chemical of concern in soil. The risk assessment assumed that only hexavalent chromium, the more toxic form of chromium, was present at the site. While this likely results in some overestimation of risk, this uncertainty could be reduced by analyzing samples from areas of concern for hexavalent chromium.

2,3,7,8-TCDD (dioxin) was identified as a COC in surface soil in all exposure units, and in subsurface soil at the community center. IRIS does not currently list an RFD or SF for 2,3,7,8-TCDD. EPA is currently reassessing the toxicity of dioxin. The toxicity data used in this risk assessment were obtained from the 1997 HEAST. Some dioxin samples that were analyzed by Draft Screening Method 4425 were not used in the baseline risk assessment because of uncertainty associated with the analytical method. Using the 1997 HEAST toxicity data and excluding the dioxin screening data may lead to an under- or overestimation of risk.

All of the uncertainties ultimately effect the risk estimate. Most of the uncertainties identified will likely result in the potential for overestimation of risk (e.g., the combination of several upper-bound assumptions for some exposure scenarios).

## 5.7 Identification of Contaminants of Concern

The BHHRA evaluated soil, surface water and groundwater. The occurrence, distribution and selection of the chemicals of potential concern (COPC) are in the tables in Appendix C of this ROD. The medium-specific exposure point concentration for the COPCs are in the tables in Appendix D in this ROD. Based on the evaluation of health effects, the soil, groundwater and surface water media were found to have COCs. The initial COCs identified for the Jacksonville Ash Site including the area of the former incinerators at Forest Street and 5th & Cleveland, the Park at Lonnie C. Miller and the separate evaluation of the residential areas are presented in Table 36.

| Table 36: Initial Human Health Constituents of Concern | | |
|---|---|---|
| Soil | Groundwater | Surface Water |
| Aluminum | Iron | Carcinogenic PAHs |
| Antimony | Barium (F) | |
| Arsenic | Manganese (F) (L) | |
| Barium | Arsenic (C) | |
| Cadmium | Cadmium (L) | |
| Chromium | 1,2-Dibromo-3-Chloropropane (C) | |
| Copper | Aroclor 1242 (C) | |
| Iron | Cresol (M & P) (L) | |
| Lead | cis-1,2-Dichloroethylene (L) | |
| Manganese | Vinyl Chloride (L) | |
| Zinc | | |
| Carcinogenic PAHs | | |
| Dioxin (2,3,7,8-TCDD) | | |
| Cobalt (F) | | |
| Nickel (F) (L) | | |
| Silver (F) | | |
| Thallium (F) (L) | | |
| Vanadium (F) | | |
| Aroclor 1260 (C) | | |
| Aroclor 1254 (L) | | |
| alpha-Chlordane (C) | | |
| gamma-Chlordane (C) | | |
| Dieldrin (C) | | |
| Heptachlor (C) | | |
| Heptachlor Epoxide (C) | | |

| |
|---|
| Notes on COC table:<br>COCs without notation are common to all three sites. COCs with notations as follow are specific to that site:<br>Forest Street (F)<br>5th & Cleveland (C)<br>Lonnie C. Miller, Sr. Park (L)<br><br>The COCs in soil were developed without the evaluation of background soil concentrations. |

## 5.8 Refinement of Contaminants of Concern

As indicated in Part 5.6, uncertainties are inherent in the risk assessment process. Most these uncertainties result in the potential for overestimation of risk (e.g., the combination of several upper-bound assumptions for some exposure scenarios). Therefore, the BHHRA included refinement in the number of COCs identified in the risk characterization by examining any chemical-specific uncertainties that may exist.

### 5.8.1 Soil

#### 5.8.1.1 Forest Street Incinerator Soil

A total of 18 chemicals were identified as COCs in on-site soil: antimony, arsenic, barium, cadmium, CPAHs, chromium, cobalt, copper, dioxin (2,3,7,8-TCDD), iron, lead, manganese, nickel, silver, thallium, vanadium, and zinc. Most of the COCs identified appear to be site-related COCs; however, additional discussion is warranted for seven of the COCs: chromium, cobalt, iron, nickel, silver, thallium, and zinc.

Iron, identified as a COC in soil, is the most common of all metals in the environment. Iron is one of the most important elements in nutrition, although iron toxemia occurs when high levels of iron are consumed. The oral RfD for iron is a provisional value. Most of the quantitative chronic oral toxicity data for iron have been obtained from studies of the Bantu population of South Africa. These studies were based on consumption of iron after drinking beer that was brewed in iron vessels. However, data from the Bantu studies were considered inadequate to determine a LOAEL because of confounding factors. The iron RfD is based on the mean dietary iron intakes, dietary plus supplemental, taken from the NHANES II data base. The highest dose level from the NHANES II study was used as a NOAEL, and the RfD was established on this basis. Additional toxicological data are needed to complete the verification process for the RfD. As stated above, hazards associated with chemicals with provisional toxicity values are likely to be overly conservative. Iron was removed as a COC for the Forest Street soils.

Chromium was identified as a COC in surface and subsurface soil. The risk assessment assumed that only hexavalent chromium, the more toxic form of chromium, was present at the site. This likely results in some overestimation of risk. Hexavalent chromium is more mobile than trivalent chromium; if hexavalent chromium is detected in soil, it will generally be present in groundwater also. However, as indicated chromium was not detected in groundwater. Therefore, it is unlikely that hexavalent chromium is the only form of chromium in the soil. In fact, it is customary to assume that when total chromium is analyzed the ratio of hexavalent chromium to trivalent chromium (the less toxic form of chromium) is 1 to 6. The maximum detected concentrations of chromium in surface soil and subsurface soil were 74 mg/kg and 70 mg/kg, respectively. Both of these concentrations are well below the PRG of 10,000 mg/kg for trivalent chromium. The uncertainty of not knowing the speciation of chromium could be reduced by analyzing samples for hexavalent chromium. Chromium was removed as a COC for the Forest Street soils.

Five metals were identified as COCs in subsurface soil, but were not identified as COCs in surface soil or groundwater: cobalt, nickel, silver, thallium, and zinc. In fact, none of these metals was retained as a COPC in surface soil or groundwater. Cobalt, nickel, silver, and thallium were detected in only one subsurface soil sample (FSSB007) at a concentration exceeding their respective PRGs. Out of a total of 31 surface and subsurface soil samples that were analyzed for TAL metals, thallium was detected in only one sample (FSSB007). Therefore, since cobalt, nickel, silver, and thallium were detected only once at a concentration exceeding their respective PRG, these metals were below risk-based screening values in surface soil and groundwater, and subsurface soil is not currently available for direct contact, these metals are not likely to pose a significant threat to receptors at the site and were removed as COCs for the Forest Street soils.

Zinc was detected in two subsurface soil samples at concentrations exceeding the PRG of 2,300 mg/kg. Zinc was detected at concentrations of 3,500 mg/kg and 3,800 mg/kg in samples FSSB088 and FSSB110, respectively. These concentrations are not significantly higher than the PRG (less than two times greater). Therefore, since detected concentrations of zinc were below risk-based screening levels in surface soil and groundwater, it was detected only two times at concentrations slightly exceeding its PRG, and subsurface soil is not currently available for direct contact, zinc is not likely to pose a significant threat to receptors at the site and was removed as a COC for the Forest Street soils.

#### 5.8.1.2 5th & Cleveland Incinerator Soil

A total of 14 chemicals were identified as COCs in on-site soils: aluminum, antimony, aroclor 1260, arsenic, barium, cadmium, carcinogenic PAHs, chromium, copper, iron, lead, manganese, 2,3,7,8-TCDD, and zinc. Most of the COCs identified appear to be site-related COCs; however, additional discussion is warranted for nine of the COCs: aluminum, iron, chromium, zinc, dieldrin, gamma-chlordane, alpha-chlordane, heptachlor and heptachlor epoxide.

The maximum detected concentration of aluminum in surface soil was 5,300 mg/kg. The EPA PRG for aluminum is 7,600 mg/kg; therefore, aluminum was eliminated as a COPC in surface soil in all three exposure units. Aluminum was detected in only one subsurface soil sample at a concentration exceeding the PRG (it was detected at a concentration of 8,000 mg/kg in subsurface soil sample FCSB042). Only a provisional RfD was available for aluminum (provisional toxicity values have not gone through the verification necessary to be placed by EPA on IRIS or HEAST). Hazards associated with chemicals with provisional toxicity values are likely to be overly conservative. Therefore, since aluminum was detected only once at a concentration exceeding its PRG, the hazard quotients for aluminum are based on a provisional RfD, and subsurface soil is not currently available for direct contact, aluminum is not likely to pose a significant threat to receptors at the site and was removed as a COC for the 5th & Cleveland soils.

Iron, another COC identified in soil, is the most common of all metals in the environment. Iron is an essential element in nutrition, although iron toxemia occurs when high levels of iron are consumed. The oral RfD for iron is a provisional value. Most of the quantitative chronic oral toxicity data for iron have been obtained from studies of the Bantu population of South Africa. These studies were based on consumption of iron after drinking beer that was brewed in iron vessels. However, data from the Bantu studies were considered inadequate to determine a LOAEL because of confounding factors. The iron RfD is based on the mean dietary iron intakes, dietary plus supplemental, taken from the NHANES II data base. The highest dose level from the NHANES II study was used as a NOAEL, and the RfD was established on this basis. Additional toxicological data are needed to complete the verification process for the RfD. As stated above, hazards associated with chemicals with provisional toxicity values are likely to be overly conservative and was removed as a COC for the 5th & Cleveland soils.

The maximum detected concentration of zinc in surface soil was 1,300 mg/kg. The EPA PRG for zinc is 2,300 mg/kg; therefore, zinc was eliminated as a COPC in surface soil in all three exposure units. Zinc was detected in only one subsurface soil sample (sample FCSB054) at a concentration (2,800 mg/kg) that exceeded the PRG. This concentration is not significantly higher than the PRG of 2,300 mg/kg. Therefore, since zinc was detected only once at a concentration exceeding its PRG and subsurface soil is not currently available for direct contact, zinc is not likely to pose a significant threat to receptors at the site and was removed as a COC for the 5th & Cleveland soils.

Chromium was identified as a COC in subsurface soil at the community center and in surface and subsurface soil at the park. The risk assessment assumed that only hexavalent chromium, the more toxic form of chromium, was present at the site. This likely results in some overestimation of risk. Hexavalent chromium is more mobile than trivalent chromium; if hexavalent chromium is detected in soil, it will generally be present in groundwater also. However, chromium was not detected in groundwater. Therefore, it is unlikely that hexavalent chromium is the only form of chromium in the soil. In fact, it is customary to assume that when total chromium is analyzed the ratio of hexavalent chromium to trivalent chromium (the less toxic form of chromium) is 1 to 6. The maximum detected concentrations of chromium in surface soil and subsurface soil were 28 mg/kg and 41 mg/kg, respectively. Both of these concentrations are well below the PRG of 10,000 mg/kg for trivalent chromium. The uncertainty of not knowing the speciation of chromium could be reduced by analyzing samples from areas of concern for hexavalent chromium. Chromium was removed as a COC for the 5th & Cleveland soils.

Pesticides use is widespread in the residential markets, and the pesticides detected are not thought to be site related because there were few detections and low concentrations of pesticides in the area with the highest concentrations of ash related contamination in the former incinerator area (Emmett Reed Park). Pesticides were only listed as COCs in the residential area of the 5th & Cleveland site and were not found to be COCs at the former incinerator area. The presence of pesticides at the site is likely related to general pest control in the area, therefore the following pesticides were removed from the COC list: dieldrin, gamma-chlordane, alpha-chlordane, heptachlor and heptachlor epoxide.

### 5.8.1.3 Lonnie C. Miller, Sr., Park Soil

A total of 14 chemicals were identified as COCs in on-site soil: antimony, aroclor 1254 (subsurface soil only), arsenic, cadmium, chromium, CPAHs, copper, iron, lead, manganese, nickel (subsurface soil only), thallium, dioxin (2,3,7,8-TCDD), and zinc. Most of the COCs identified appear to be site-related COCs; however, additional discussion is warranted for two of the COCs: chromium and iron.

Iron, identified as a COC in soil (surface and subsurface), is the most common of all metals in the environment. Iron is one of the most important elements in nutrition, although iron toxemia occurs when high levels of iron are consumed. The oral RfD for iron is a provisional value. Most of the quantitative chronic oral toxicity data for iron have been obtained from studies of the Bantu population of South Africa. These studies were based on consumption of iron after drinking beer that was brewed in iron vessels. However, data from the Bantu studies were considered inadequate to determine a LOAEL because of confounding factors. The iron RfD is based on the mean dietary iron intakes, dietary plus supplemental, taken from the NHANES II data base. The highest dose level from the NHANES II study was used as a NOAEL, and the RfD was established on this basis. Additional toxicological data are needed to complete the verification process for the RfD. As stated above, hazards associated with chemicals with provisional toxicity values are likely to be overly conservative. Iron was removed as a COC for the Lonnie C. Miller soils.

Chromium was identified as a COC in surface and subsurface soil. The risk assessment assumed that only hexavalent chromium, the more toxic form of chromium, was present at the site. This likely results in some overestimation of risk. Hexavalent chromium is more mobile than trivalent chromium; if hexavalent chromium is detected in soil, it will generally be present in groundwater also. However, chromium was not detected in groundwater. Therefore, it is unlikely that hexavalent chromium is the only form of chromium in the soil. In fact, it is customary to assume that when total chromium is analyzed the ratio of hexavalent chromium to trivalent chromium (the less toxic form of chromium) is 1 to 6. The maximum detected concentrations of chromium in surface soil and subsurface soil were 160 mg/kg and 370 mg/kg, respectively. Both of these concentrations are well below the PRG of 10,000 mg/kg for trivalent chromium. The uncertainty of not knowing the speciation of chromium could be reduced by analyzing samples for hexavalent chromium. Chromium was removed as a COC for the Lonnie C. Miller soils.

### 5.8.2 Groundwater

### 5.8.2.1 Forest Street Incinerator Groundwater

Three chemicals were identified as COCs in groundwater: barium, iron, and manganese. However, the presence of two of these COCs warrant additional discussion.

Although barium was detected in each well, its maximum detected concentration of 0.35 mg/L was well below the maximum contaminant level (primary MCL) of 2 mg/L.
Iron was identified as a COC in groundwater. Iron is an essential element in nutrition. The provisional oral RfD for iron was derived based on the mean dietary iron intakes taken from the

NHANES II data base (a NOAEL). Therefore, additional toxicological data are needed to complete the verification process for the RfD. Also, iron was detected in only three of 19 groundwater samples. As stated above, hazards associated with chemicals with provisional toxicity values are likely to be overly conservative. Barium and iron were removed as COCs for the Forest Street groundwater.

### 5.8.2.2 5th & Cleveland Incinerator Groundwater

Four chemicals were identified as COCs in groundwater: arsenic, aroclor 1242, and 1,2-dibromo-3-chloropropane, and iron. However, the presence of three of these COCs warrant additional discussion.

Two of the four COCs in groundwater (aroclor 1242 and arsenic) were detected in only one of five groundwater samples collected and analyzed during the RI. Arsenic was detected at a concentration of 0.0035 mg/L, which is well below the maximum contaminant level (MCL) of 0.01 mg/L. Arsenic was removed as a COC for the 5th & Cleveland groundwater. Aroclor 1242 was detected at a concentration of 0.0014 mg/L. This concentration is above the MCL of 0.0005 mg/L. Based on the low frequency of detection, the BHHRA recommended that additional samples be collected to confirm the presence of aroclor 1242 in groundwater.

Iron was identified as another COC in groundwater. Iron is an essential element in nutrition. The provisional oral RfD for iron was derived based on the mean dietary iron intakes taken from the NHANES II data base (a NOAEL). Therefore, additional toxicological data are needed to complete the verification process for the RfD. As stated above, hazards associated with chemicals with provisional toxicity values are likely to be overly conservative. Iron was removed as a COC for the 5th & Cleveland groundwater.

### 5.8.2.3 Lonnie C. Miller, Sr., Park Groundwater

Six chemicals were identified as COCs in groundwater: cadmium, cresol (M & P), cis-1,2-dichloroethylene, iron, manganese, and vinyl chloride. However, the presence of five of these COCs warrants additional discussion.

Four of the COCs in groundwater (cadmium, cis-1,2-dichloroethylene, cresol (M & P), and vinyl chloride) were detected in only one of six groundwater samples collected and analyzed during the RI. Cadmium was detected at a concentration of 0.0034 mg/L, which is well below the maximum contaminant level (MCL) of 2 mg/L. Cis-1,2-dichloroethylene was detected at a concentration of 0.016 mg/L, which is below the MCL of 0.07 mg/L. Vinyl chloride (detected at a concentration of 0.00054 mg/L) was also below its federal and state MCLs of 0.002 mg/L and 0.001 mg/L, respectively. Cresol (M & P) was detected at a concentration of 0.075 mg/L. **Cresol (M & P) does not have an MCL.** However, based on its low frequency of detection, the BHHRA recommended that additional samples be collected to confirm the presence of cresol in groundwater. Cesol (M & P ) was not detected during the 2003 round of groundwater sampling and was removed as a COC for the Lonnie C. Miller groundwater as were the other three chemicals.

Iron was identified as another COC in groundwater. Iron is an essential element in nutrition. The provisional oral RfD for iron was derived based on the mean dietary iron intakes taken from the NHANES II data base (a NOAEL). Therefore, additional toxicological data are needed to complete the verification process for the RfD. As stated above, hazards associated with chemicals with provisional toxicity values are likely to be overly conservative. Iron was removed as a COC for the Lonnie C. Miller groundwater.

### 5.8.3 Surface Water

#### 5.8.3.1 Forest Street Incinerator Surface Water

Carcinogenic PAHs were identified as COCs in surface water. Six individual carcinogenic PAH compounds were detected in surface water: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-c,d)pyrene. Benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene were detected in one out of eight samples. Benzo(a)anthracene, chrysene, and indeno(1,2,3-c,d)pyrene were each detected in two out of eight samples. Risk from dermal exposure to CPAHs in surface water was $4 \times 10^{-4}$, which is above EPA's acceptable risk range. There are a number of factors that impact this risk estimate. The critical issue that should first be noted is a change in the EPA dermal risk guidance (RAGS Volume I, Part E) that was finalized since the completion of the risk assessment report for this site. In the final version of the dermal risk guidance, EPA discusses chemicals having constants such as molecular weight and Koc that fall outside specified ranges; these chemicals, which include the CPAHs and other extractable organics are said to be outside the Effective Predictive Domain. In essence, the equations used to model dermal dose/risk are not really valid for chemical with excessively high (or low) Koc, MW. The guidance goes on to discuss the high uncertainty of calculating the dose for these chemicals and that the dose/risk for these chemicals should probably not be quantified, but rather should be discussed in the uncertainty section of the risk assessment.

Another factor contributing to the uncertainty of this pathway risk is that surface water is not static so it may be difficult to obtain representative concentrations of CPAHs, or any constituent, in surface water. Additionally, the risk assessment assumed that residents waded in McCoy's Creek for a given number of days. Site-specific information was not available about the number of days residents wade in the creek. Also, if the water level varies, body surface areas contacting the water may be greater than or less than those used in the risk assessment. Finally, an oral absorption efficiency was used to convert the oral slope factor for benzo(a)pyrene to a dermal slope factor for carcinogenic PAHs. Since benzo(a)pyrene causes skin cancer through direct action at the point of application, it may be inappropriate to quantitatively evaluate dermal exposure to CPAHs using a slope factor that was converted from the oral value. Therefore, before making any remedial decisions about this exposure medium, risk managers should consider that there is considerable uncertainty associated with the cancer risk that was calculated for surface water.

Due to the low frequency of detection of CPAH compounds and the fact that risks from exposure to surface water was likely overestimated, the BHHRA concluded that exposure to CPAHs in surface water is not likely to pose a significant threat to human receptors at the site.

### 5.8.3.2 5th & Cleveland Incinerator Surface Water

Carcinogenic PAHs were identified as COCs in surface water. Three individual carcinogenic PAH compounds were detected in surface water: benzo(a)anthracene, chrysene and indeno(1,2,3-c,d)pyrene. Benzo(a)fluoranthene was detected in two out of ten samples and chrysene, and indeno(1,2,3-c,d)pyrene were each detected in one out of ten samples. Carcinogenic risk from dermal exposure to CPAHs in surface water was 1 X $10^{-5}$, which falls witin EPA's acceptable risk range. There are a number of factors that impact this risk estimate. The critical issue that should first be noted is a change in the EPA dermal risk guidance (RAGS Volume I, Part E) that was finalized since the completion of the risk assessment report for this site. In the final version of the dermal risk guidance, EPA discusses chemicals having constants such as molecular weight and Koc that fall outside specified ranges; these chemicals, which include the CPAHs and other extractable organics are said to be outside the Effective Predictive Domain. In essence, the equations used to model dermal dose/risk are not really valid for chemical with excessively high (or low) Koc, MW. The guidance goes on to discuss the high uncertainty of calculating the dose for these chemicals and that the dose/risk for these chemicals should probably not be quantified, but rather should be discussed in the uncertainty section of the risk assessment.

Another factor contributing to the uncertainty of this pathway risk is that surface water is not static so it may be difficult to obtain representative concentrations of CPAHs, or any constituent, in surface water. Although the risk assessment assumed that residents waded in the surface bodies, the surface water samples were actually collected from drainage ditches that had little or no flowing water. Also, if the water level varies, body surface areas contacting the water may be greater than or less than those used in the risk assessment. Finally, an oral absorption efficiency was used to convert the oral slope factor for benzo(a)pyrene to a dermal slope factor for carcinogenic PAHs. Since benzo(a)pyrene causes skin cancer through direct action at the point of application, it may be inappropriate to quantitatively evaluate dermal exposure to CPAHs using a slope factor that was converted from the oral value. Therefore, before making any remedial decisions about this exposure medium, risk managers should consider that there is considerable uncertainty associated with the cancer risk that was calculated for surface water.

Due to the low frequency of detection of CPAH compounds and the fact that risks from exposure to surface water was likely overestimated, the BHHRA concluded that exposure to CPAHs in surface water is not likely to pose a significant threat to human receptors at the site.

### 5.8.3.3 Lonnie C. Miller, Sr. Park Surface Water

Carcinogenic PAHs were identified as COCs in surface water. Five individual carcinogenic PAH compounds were detected in surface water: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene. Benzo(b)fluoranthene and benzo(k)fluoranthene were detected in one out of 11 samples. Benzo(a)anthracene, benzo(a)pyrene, and chrysene were each detected in two out of 11 samples. Risk from dermal exposure to CPAHs in surface water was 5 X $10^{-5}$, which is above EPA's acceptable risk range. There are a number of factors that impact this risk estimate. The critical issue that should first be noted is a change in the EPA dermal risk guidance (RAGS Volume I, Part E) that was finalized since the completion of the risk assessment report for this site. In the final version of the dermal risk guidance, EPA discusses chemicals having constants such as molecular weight and Koc that fall outside specified ranges; these chemicals, which include the CPAHs and other extractable organics are said to be outside the Effective Predictive Domain. In essence, the equations used to model dermal dose/risk are not really valid for chemical with excessively high (or low) Koc, MW. The guidance goes on to discuss the high uncertainty of calculating the dose for these chemicals and that the dose/risk for these chemicals should probably not be quantified, but rather should be discussed in the uncertainty section of the risk assessment.

Another factor contributing to the uncertainty of this pathway risk is that surface water is not static so it may be difficult to obtain representative concentrations of CPAHs, or any constituent, in surface water. Additionally, the risk assessment assumed that residents waded in the unnamed tributary for a given number of days. Site-specific information was not available about the number of days residents wade in the tributary. Also, if the water level varies, body surface areas contacting the water may be greater than or less than those used in the risk assessment. Finally, an oral absorption efficiency was used to convert the oral slope factor for benzo(a)pyrene to a dermal slope factor for carcinogenic PAHs. Since benzo(a)pyrene causes skin cancer through direct action at the point of application, it may be inappropriate to quantitatively evaluate dermal exposure to CPAHs using a slope factor that was converted from the oral value. Therefore, before making any remedial decisions about this exposure medium, risk managers should consider that there is considerable uncertainty associated with the cancer risk that was calculated for surface water.

Due to the low frequency of detection of CPAH compounds and the fact that risks from exposure to surface water was likely overestimated, the BHHRA concluded that exposure to CPAHs in surface water is not likely to pose a significant threat to human receptors at the site.

### 5.8.4 Refined List of COCs

The refined list of Site COCs is presented in Table 37.

Table 37: Refined Human Health Constituents of Concern

| Soil | Groundwater |
|---|---|
| Antimony | manganese (F, L) |
| Arsenic | aroclor 1242 (C) |
| Cadmium | 1,2-dibromo-3-chloropropane (C) |
| Copper | |
| Lead | |
| Manganese | |
| TEQ of 2,4,7,8, TCDD | |

| | |
|---|---|
| Carcinogenic Polycyclic aromatic hydrocarbons | |
| Aroclor-1260 (C) | |
| Aroclor-1254 (L) | |
| Barium (F) (C) | |
| Nickel (L) | |
| Thallium (L) | |
| Vanadium (F) | |
| Zinc (L) | |
| Notes on COC table:<br>COCs without notation are common to all three properties. COCs with notations as follow are specific to that site:<br>Forest Street (F)<br>5th & Cleveland (C)<br>Lonnie C. Miller, Sr. Park (L) | |

The refined list of COCs and the Remedial Goal Options (RGOs) for soil and groundwater developed during the HHBRAs are in Tables 38, 39, 40, 41, 42 and 43.

TABLE 12.1
RISK-BASED REMEDIAL GOAL OPTIONS
CURRENT/FUTURE CHILD AND ADULT RESIDENT - SURFACE/SUBSURFACE SOIL (mg/kg)
JACKSONVILLE ASH SITE - FOREST STREET INCINERATOR
JACKSONVILLE, DUVAL COUNTY, FLORIDA

| CHEMICAL | HAZARD INDEX * | | | CARCINOGENIC RISK | | | EPA ARARs (mg/kg) |
|---|---|---|---|---|---|---|---|
| | 0.1 | 1 | 3 | 10-6 | 10-5 | 10-4 | -- |
| Antimony | 1.0 | 10 | 31 | -- | -- | -- | -- |
| Arsenic | 2.3 | 23 | 69 | 0 6 | 6 | 60 | -- |
| Barium | 416 | 4,166 | 12,500 | -- | -- | -- | -- |
| Cadmium | 2.7 | 27 | 82 | -- | -- | -- | -- |
| Copper | 281 | 2,810 | 8,430 | -- | -- | -- | -- |
| Lead | -- | -- | -- | -- | -- | -- | 400 ** |
| Manganese | 386 | 3,858 | 11,574 | -- | -- | -- | -- |
| Vanadium | 49.1 | 491 | 1,473 | -- | -- | -- | -- |
| CPAHs [benzo(a)pyrene] | -- | -- | -- | 0.07 | 0.7 | 7 | -- |
| 2,3,7,8-TCDD (Dioxin) | -- | -- | -- | 0.000003 | 0.00003 | 0.0003 | 0.001 ** |

Notes:
* Based on child exposure only.
** These values are based on EPA OSWER Directives.
-- - Not Applicable

ROD Table 38

**TABLE 12.2**
**RISK-BASED REMEDIAL GOAL OPTIONS**
**FUTURE CHILD RESIDENT - GROUNDWATER (mg/L)**
**JACKSONVILLE ASH SITE - FOREST STREET INCINERATOR**
**JACKSONVILLE, DUVAL COUNTY, FLORIDA**

| CHEMICAL | HAZARD INDEX | | | CARCINOGENIC RISK | | | Maximum Contaminant Levels (MCLs) (mg/L) | Florida MCLs (mg/L) |
|---|---|---|---|---|---|---|---|---|
| | 0.1 | 1 | 3 | 10-6 | 10-5 | 10-4 | -- | -- |
| Manganese | 0.03 | 0.3 | 0.9 | -- | -- | -- | NE | -- |

Notes:

-- - *Not Applicable*
NE - Not Established

ROD Table 39

TABLE 12.1
RISK-BASED REMEDIAL GOAL OPTIONS
FUTURE CHILD AND ADULT RESIDENT - SURFACE/SUBSURFACE SOIL (mg/kg)
JACKSONVILLE ASH SITE - 5TH AND CLEVELAND
JACKSONVILLE, DUVAL COUNTY, FLORIDA

| CHEMICAL | HAZARD INDEX* (mg/kg) | | | CARCINOGENIC RISK (mg/kg) | | | EPA ARARs (mg/kg) |
|---|---|---|---|---|---|---|---|
| | 0.1 | 1 | 3 | 10-6 | 10-5 | 10-4 | -- |
| Antimony | 2.9 | 29 | 87 | -- | -- | -- | -- |
| Arsenic | 2.3 | 23 | 69 | 0.59 | 5.9 | 59 | -- |
| Barium | 496 | 4,960 | 14,880 | -- | -- | -- | -- |
| Cadmium | 3.5 | 35 | 105 | -- | -- | -- | -- |
| Chromium | 21.1 | 211 | 633 | -- | -- | -- | -- |
| Copper | 281 | 2,810 | 8,430 | -- | -- | -- | -- |
| Manganese | 479 | 4,790 | 14,370 | -- | -- | -- | -- |
| Lead | -- | -- | -- | -- | -- | -- | 400** |
| CPAHs (Benzo(a)pyrene) | -- | -- | -- | 0.07 | 0.7 | 7 | -- |
| 2,3,7,8-TCDD (Dioxin) | -- | -- | -- | 0.000003 | 0.00003 | 0.0003 | 0.001** |
| PCB 1260 (Aroclor 1260) | -- | -- | -- | 0.26 | 2.6 | 26 | -- |

Notes: *Based on Child Exposure Only
**These values are based based on EPA OSWER Directives
-- - Not Applicable

ROD Table 40

TABLE 12.2
RISK-BASED REMEDIAL GOAL OPTIONS
FUTURE CHILD AND ADULT RESIDENT - GROUNDWATER (mg/L)
JACKSONVILLE ASH SITE - 5TH AND CLEVELAND
JACKSONVILLE, DUVAL COUNTY, FLORIDA

| CHEMICAL | HAZARD INDEX* (mg/L) | | | CARCINOGENIC RISK (mg/L) | | | EPA Maximum Contaminant Levels (MCLs) (mg/L) | Florida MCLs (mg/L) |
|---|---|---|---|---|---|---|---|---|
| | 0.1 | 1 | 3 | 10-6 | 10-5 | 10-4 | -- | -- |
| 1,2-Dibromo-3-Chloropropanol | 0.00018 | 0.0018 | 0.0054 | 0.00003 | 0.0003 | 0.003 | -- | -- |
| PCB 1242 (Aroclor 1242) | -- | -- | -- | 0.00003 | 0.0003 | 0.003 | 0.0005 | -- |

Notes: *Based on Child Exposure Only
-- - Not Applicable

ROD Table 41

**TABLE 12.1**
**RISK-BASED REMEDIAL GOAL OPTIONS**
**CURRENT/FUTURE CHILD AND ADULT RESIDENT - SURFACE/SUBSURFACE SOIL/SEDIMENT (mg/kg)**
**JACKSONVILLE ASH SITE - LONNIE C. MILLER**
**JACKSONVILLE, DUVAL COUNTY, FLORIDA**

| CHEMICAL | HAZARD INDEX * | | | CARCINOGENIC RISK | | | EPA ARARs (mg/kg) |
|---|---|---|---|---|---|---|---|
| | 0.1 | 1 | 3 | 10-6 | 10-5 | 10-4 | -- |
| PCB-1254 (Aroclor 1254) | 0.1 | 1 | 3 | 0.5 | 5 | 50 | -- |
| Antimony | 1 | 10 | 31 | 1.15 | 11.5 | 115 | -- |
| Arsenic | 2.3 | 23 | 69 | -- | -- | -- | -- |
| Cadmium | 2.7 | 27 | 82 | -- | -- | -- | -- |
| Copper | 281 | 2,810 | 8,430 | -- | -- | -- | -- |
| CPAHs (Benzo(a)pyrene) | -- | -- | -- | 0.07 | 0.7 | 7 | -- |
| 2,3,7,8-TCDD (Dioxin) | -- | -- | -- | 0.000006 | 0.00006 | 0.0006 | 0.001** |
| Lead | -- | -- | -- | -- | -- | -- | 400 ** |
| Manganese | 386 | 3,858 | 11,574 | -- | -- | -- | -- |
| Nickel | 143 | 1,433 | 4,299 | -- | -- | -- | -- |
| Thallium | 0.5 | 5 | 15 | -- | -- | -- | -- |
| Zinc | 210 | 2,105 | 6,315 | -- | -- | -- | -- |

Notes:

* Based on Child Exposure only
** These values are based on EPA OSWER Directives
-- Not Applicable

ROD Table 42

TABLE 12.2
RISK-BASED REMEDIAL GOAL OPTIONS
FUTURE CHILD AND ADULT RESIDENT - GROUNDWATER (mg/L)
JACKSONVILLE ASH SITE - LONNIE C. MILLER
JACKSONVILLE, DUVAL COUNTY, FLORIDA

| CHEMICAL | HAZARD INDEX * | | | CARCINOGENIC RISK | | | Maximum Contaminant Levels (MCLs) (mg/L) | Florida MCLs (mg/L) |
|---|---|---|---|---|---|---|---|---|
| | 0.1 | 1 | 3 | 10-6 | 10-5 | 10-4 | -- | -- |
| Manganese | 0.03 | 0.3 | 0.9 | -- | -- | -- | NE | -- |

Notes:
* Based on Child Exposure only
-- Not Applicable
NE Not Established

ROD Table 43

### 5.8.5 Risk Management Decision

The BHHRA named three refined COCs for groundwater, the PCB aroclor 1242, 1,2-dibromo-3-chloropropane and manganese and recommended additional sampling due to infrequent detection and low concentrations. The additional groundwater sampling was conducted in 2003. PCB Aroclor 1242 and 1,2-dibromo-3-chloropropane were not detected in the 2003 sampling event and are removed from the list of COCs for groundwater. EPA did observe a slight elevation of manganese concentrations near the site relative to the background wells. Manganese does not have a maximum contaminant levels (MCLs). However, of the 37 monitoring wells sampled during the 2003 event, all but one of the manganese concentrations (0.99 ppm) are within the noncarcinogenic risk range for manganese (i.e., 0.03 ppm to 0.9 ppm) as calculated in the Final Human Health Risk Assessment and the EPA Region 9 PRG safe drinking water level of 0.88 ppm.

EPA concludes that the groundwater sampling performed to date indicates a lack of significant groundwater impact from the ash contamination. However, groundwater monitoring will be instituted to verify the "No Action " decision on the groundwater.

## 5.9 Final Human Health Contaminants of Concern

Table 44 lists the final human health COCs for the Jacksonville Ash Site.

| Table 44: Final Human Health Constituents of Concern |
|---|
| Soil |
| Antimony |
| Arsenic |
| Cadmium |
| Copper |
| Lead |
| Manganese |
| TEQ of 2,4,7,8, TCDD |
| Carcinogenic Polycyclic aromatic hydrocarbons |
| Aroclor-1260 (C) |
| Aroclor-1254 (L) |
| Barium (F) (C) |
| Nickel (L) |
| Thallium (L) |
| Vanadium (F) |
| Zinc (L) |
| Notes on COC table:<br>COCs without notation are common to all three sites. COCs with notations as follow are specific to that site:<br>Forest Street (F)<br>5th & Cleveland (C)<br>Lonnie C. Miller, Sr. Park (L)<br><br>The COCs in soil were developed without the evaluation of background soil concentrations. |

# PART 6: SUMMARY OF ECOLOGICAL RISK

## 6.1 Summary of Ecological Risk Assessment

Like the Human Health Risk Assessment, the Ecological Risk Assessment (ERA) was performed by EPA. The ERA encompassed all ecological risk assessment activities at the Jacksonville Ash Site through Step 3A of the Interim Final 8-Step Ecological Risk Assessment Process for Superfund (EPA 1997) developed by the EPA. The 8-Step Ecological Risk Assessment process includes the following:

- Step 1 - Screening - Level Problem Formulation and Ecological Effects Evaluation
- Step 2 - Screening - Level Exposure Estimate and Risk Calculation
- Step 3 - Problem Formulation
- Step 4 - Study Design and Data Quality Objective (DQO) Process
- Step 5 - Verification of Field Sampling Design
- Step 6 - Site Investigation and Data Analysis
- Step 7 - Risk Characterization
- Step 8 - Risk Management

### 6.1.1 Step 1 - Level Problem Formulation and Ecological Effects Evaluation

For this initial step, EPA developed an understanding of the site based on the environmental setting of the site, suspected contaminants present, the fate and transport mechanisms of these contaminants, mechanisms of ecotoxicity for the chemicals, potential ecological receptors, and exposure pathways. Based on the information gathered to describe these elements, assessment and measurement endpoints were selected as a basis for defining risk. The outcome of Step 1 was the generation, by environmental media (i.e., soil, sediment, surface water), of a list of contaminants for consideration in Step 2.

### 6.1.2 Step 2 - Screening - Level Exposure Estimate and Risk Calculation

During this phase of the ERA, comparison of contaminants were made to surface soil, sediment and surface water ecological screening values (ESVs).

Soil: The surface soil analytical data set from the summer 2000 RI sampling was screened against the selected ESVs for soil. This initial screening indicated that several contaminants were present at concentrations exceeding these ESVs. Contaminants exceeding screening values (those presenting a screening hazard quotient (HQ) of 1 or greater) were retained as preliminary contaminants of potential ecological concern (PCOPEC).

Sediment: The sediment analytical data results were screened against the selected ESVs for sediment. This initial screening indicated that several contaminants were present at concentrations exceeding ESVs for sediment. Contaminants exceeding screening values (those presenting a screening HQ of 1 or greater) were retained as PCOPEC.

Surface Water: The surface water analytical data results were screened against the selected ESVs for surface water. This initial screening indicated that several contaminants were present at concentrations exceeding these ESVs. Contaminants exceeding screening values (those presenting a screening HQ of 1 or greater) were retained as PCOPEC.

### 6.1.3 Step 3a - Problem Formulation (Refinement of Contaminants of Potential Ecological Concern)

The first action taken under Step 3 of the ERA process is refinement of the PCOPECs identified in Step 2 to determine the need for, or focus of, further investigations. Contaminants that exceeded the approved ESVs, or that could not be screened due to a lack of an ESV (and therefore identified as PCOPEC) were primarily evaluated based on an approved set of ERVs. The ERVs for each contaminant were approved by EPA's Ecological Technical Assistance Group (ETAG) based on a comparative analysis of the available toxicological studies. Based on the ecological setting and the list of PCOPEC, a preliminary ecological exposure model was developed.

The preliminary ecological exposure model presents the most significant exposure pathways to ecological receptors based on the following principal exposure routes:

- Direct Exposure to the contaminants in a media of concern
- Food chain transfer of the contaminant in biological tissue of prey organisms

Refinement of PCOPEC was performed to determine contaminants of potential ecological concern (COPEC) for both direct exposure and through food chain exposure. Based on the refinement of COPEC presented in the ERA, the following conclusions were presented on a media-by-media basis for surface soils, sediment, and surface waters evaluated at the Jacksonville Ash Site. These conclusions also considered the quality of the available habitat and the benefits/drawbacks to continuing with additional evaluations to more accurately define the ecological risks.

- The ERA concluded that concentrations of COPEC in surface soil present a risk to terrestrial communities at all three sites. Some of the risk is associated with contaminants which pose risk from direct exposure while other risk is associated with contaminants which pose a risk from food chain exposure.
- The ERA concluded that concentrations of COPEC in sediment present a risk to aquatic communities at all three sites. Some of the risk is associated with contaminants which pose risk from direct exposure while other risk is associated with contaminants which pose a risk from food chain exposure.
- The surface water refinement determined that there were direct exposure COPEC observed in surface water at the 5th & Cleveland and Lonnie C. Miller Park sites. Forest Street was found to have no direct exposure COPECs in surface water. Surface water was not evaluated as a substrate media for food chain exposure because it represents a minor exposure pathway to wildlife. The ERA concluded that the surface water at all three sites is not a source of contamination, but a pathway that is highly transient and changes with climate conditions and that the ash related COPECs are relatively insoluble and a minor exposure pathway for wildlife. Therefore, no remediation is necessary.

Tables 45, 46, 47, 48, 49 and 50 list the COPECs for soil and sediment and the preliminary ecological remedial goals developed by the ERAs.

## Table 5-1
## Ecological Preliminary Remedial Goals for Surface Soils
## Jacksonville Ash Superfund Site
## Forrest Street

| Contaminant | Preliminary Remedial Goal | Driver |
|---|---|---|
| **Inorganics (mg/KG)** | | |
| ALUMINUM | 600 b | Direct exposure |
| ANTIMONY | 5 | Direct exposure |
| CHROMIUM, TOTAL | 32 | Direct exposure |
| COPPER | 61 | Direct exposure |
| IRON | 200 | Direct exposure |
| LEAD | 400 a | Food chain exposure |
| SILVER | 10 | Direct exposure |
| ZINC | 200 | Direct exposure |
| MERCURY | 0.012 a | Food chain exposure |
| **Pesticide/PCBs (ug/KG)** | | |
| 4,4'-DDT | 17.5 | Direct exposure |
| ALPHA-CHLORDANE | 100 | Direct exposure |
| GAMMA-CHLORDANE | 100 | Direct exposure |
| AROCLOR-1260 | 40 | Direct exposure |

**Notes:**

a) Represents average soil concentration that should be the remedial goal for food-chain exposure driven COPEC.
b) The PRG for aluminum is based on the assumption of a soil pH less than 5.5.

ROD Table 45

**Table 5-2**
**Ecological Preliminary Remedial Goals for Sediment**
**Jacksonville Ash Superfund Site**
**Forrest Street**

| Contaminant | Preliminary Remedial Goal[a] | Driver |
|---|---|---|
| **Inorganics (mg/KG)** | | |
| ALUMINUM | NA | - |
| BERYLLIUM | 200 | Direct exposure |
| LEAD | 71.2 | Food chain exposure |
| SILVER | 1.77 | Direct exposure |
| VANADIUM | NA | - |
| THALLIUM | NA | - |
| ZINC | 270 | Direct exposure |
| **Dioxins (ng/KG)** | | |
| TEQ of 2,3,7,8-TCDD | 25 | Direct exposure |
| **Pesticides (ug/KG)** | | |
| ALPHA-CHLORDANE | 4.79 | Direct exposure |
| DIELDRIN | 4.3 | Direct exposure |
| GAMMA-CHLORDANE | 4.79 | Direct exposure |
| **Semivolatiles (ug/KG)** | | |
| BENZO(a)ANTHRACENE | 385 | Direct exposure |
| BENZO(g,h,i)PERYLENE | 170 | Direct exposure |
| BENZO(k)FLUORANTHENE | 240 | Direct exposure |
| CARBAZOLE | NA | - |
| INDENO(1,2,3-cd)PYRENE | 200 | Direct exposure |
| SUM TOTAL PAHs | 14000 (b) | Direct exposure |

**Notes:**

a) Represents average sediment concentration that should be the remedial goal

b) COPC average protective concentration (LOAEC) for direct ex[posure to benthic invertebrates from Table 2 of DiToro and McGrath (2000)

NA - Not available due to a lack of toxicity data.

ROD Table 46

# Table 5-1
## Ecological Preliminary Remedial Goals for Surface Soils
## Jacksonville Ash Superfund Site
## 5th and Cleveland
## Page 1 of 1

| Contaminant | Preliminary Remedial Goal | Driver |
|---|---|---|
| **Inorganics (mg/KG)** | | |
| ANTIMONY | 5 | Direct exposure |
| BARIUM | 500 | Direct exposure |
| CHROMIUM, TOTAL | 32 | Direct exposure |
| COPPER | 61 | Direct exposure |
| IRON | 200 | Direct exposure |
| LEAD | 400 a | Food chain exposure |
| ZINC | 200 | Direct exposure |
| VANADIUM | 2 | Direct exposure |
| MERCURY | 0.1 | Direct exposure |
| **Pesticides (ug/KG)** | | |
| 4,4-DDT | 17.5 | Direct exposure |
| DIELDRIN | 0.5 | Direct exposure |
| **Semivolatiles (ug/KG)** | | |
| SUM TOTAL PAHs | 5000 | Direct exposure |

**Notes:**
a) Represents average soil concentration that should be the remedial goal

ROD Table 47

5 9 0162

# Table 5-2
## Ecological Preliminary Remedial Goals for Sediment
## Jacksonville Ash Superfund Site
## 5th and Cleveland
## Page 1 of 1

| Contaminant | Preliminary Remedial Goal[a] | Driver |
|---|---|---|
| **Dioxins/Furans (ng/KG)** | | |
| 2,3,7,8-TCDD | 25 | Direct exposure |
| **Inorganics (mg/KG)** | | |
| BARIUM | 200 | Direct exposure |
| COPPER | 108 | Direct exposure |
| IRON | 20000 | Direct exposure |
| LEAD | 83 | Food chain exposure |
| ZINC | 270 | Direct exposure |
| MERCURY | 0.486 | Direct exposure |
| **Pesticides (ug/kg)** | | |
| ALPHA-BHC | 6 | Direct exposure |
| ALPHA-CHLORDANE | 4.79 | Direct exposure |
| DIELDRIN | 4.3 | Direct exposure |
| GAMMA-CHLORDANE | 4.79 | Direct exposure |
| p,p'-DDE | 6.75 | Direct exposure |
| p,p'-DDT | 4.77 | Direct exposure |
| **Volatile Organic Compounds (ug/kg)** | | |
| ACETONE | 453.37 | Direct exposure |
| METHYL ETHYL KETONE | 136.96 | Direct exposure |
| **Semivolatiles (ug/L)** | | |
| BENZO(a)ANTHRACENE | 385 | Direct exposure |
| BENZO(a)PYRENE | 763 | Direct exposure |
| BENZO(g,h,i)PERYLENE | 170 | Direct exposure |
| BENZO(k)FLUORANTHENE | 240 | Direct exposure |
| CHRYSENE | 846 | Direct exposure |
| DIBENZ(A,H)ANTHRACENE | 135 | Direct exposure |
| FLUORANTHENE | 1494 | Direct exposure |
| INDENO(1,2,3-cd)PYRENE | 200 | Direct exposure |
| PHENANTHRENE | 515 | Direct exposure |
| PYRENE | 875 | Direct exposure |
| SUM TOTAL PAHs | 14000 (b) | Direct exposure |

**Notes:**

a) Represents average sediment concentration that should be the remedial goal

b) COPC average protective concentration (LOAEC) for direct ex[posure to benthic invertebrates from Table 2 of DiToro and McGrath (2000)

ROD Table 48

**Table 5-1**
**Ecological Preliminary Remedial Goals for Surface Soils**
**Jacksonville Ash Superfund Site**
**Lonnie C. Miller, Jr. Park**

| Contaminant | Preliminary Remedial Goal | Driver |
|---|---|---|
| **Inorganics (mg/KG)** | | |
| ALUMINUM | 600 (b) | Direct exposure |
| ANTIMONY | 5 | Direct exposure |
| CHROMIUM, TOTAL | 32 | Direct exposure |
| COPPER | 61 | Direct exposure |
| IRON | 200 | Direct exposure |
| LEAD | 400 (a) | Food chain exposure |
| MANGANESE | 500 | Direct exposure |
| NICKEL | 90 | Direct exposure |
| SILVER | 10 | Direct exposure |
| ZINC | 200 | Direct exposure |
| MERCURY | 0.012 (a) | Food chain exposure |
| **Pesticide/PCBs (ug/KG)** | | |
| DIELDRIN | 0.5 | Direct exposure |

**Notes:**

a) Represents average soil concentration that should be the remedial goal for food-chain exposure driven COPEC.

b) The PRG for aluminum is based on the assumption that the soil pH is less than 5.5.

*ROD Table 49*

**Table 5-2**
**Ecological Preliminary Remedial Goals for Sediment**
**Jacksonville Ash Superfund Site**
**Lonnie C. Miller, Jr. Park**

| Contaminant | Preliminary Remedial Goal [a] | Driver |
|---|---|---|
| **Inorganics (mg/KG)** | | |
| ALUMINUM | NA | - |
| COPPER | 200 | Direct exposure |
| LEAD | 91.3 | Direct exposure |
| ZINC | 270 | Direct exposure |
| **Dioxins (ng/KG)** | | |
| ADJUSTED TEQ 2,3,7,8-TCDD | 25 | Food chain exposure |
| **Semivolatiles (ug/KG)** | | |
| BENZO(g,h,i)PERYLENE | 170 | Direct exposure |
| BENZO(k)FLUORANTHENE | 240 | Direct exposure |
| SUM TOTAL PAHs | 14000 (b) | Direct exposure |

**Notes:**

a) Represents average sediment concentration that should be the remedial goal

b) COPC average protective concentration (LOAEC) for direct exposure to benthic invertebrates from Table 2 of DiToro and McGrath (2000)

NA - Not available due to a lack of toxicity data.

ROD Table 50

## 6.2 Risk Management Decision (Final Contaminants of Ecological Concern)

After completion of the ERA through Step 3A, a risk management decision was made that the ecological risks were well defined and no additional ecological evaluations or assessments were required to develop preliminary RGs for the COPECs.

A risk management decision was made that the COPECs and the preliminary ecological RGs identified in Step 3A of the ERA and presented in Tables 45, 46, 47, 48, 49 and 50 would serve as Contaminants of Ecological Concern (COEC) and ecological RGs for the Site.

## 6.3 Risk Management Decision (Soil Remediation for Ecological Cleanup)

Refinement of the COPECs and preliminary ecological RGs was possible. For example, many of the COPECs for soils are metals and other inorganic chemical that are naturally occurring in the environment. Some of the COPECs are organic chemicals that are also naturally occurring or ubiquitous in urban environments. To determine background concentrations of COPECs, soil sampling was performed. Surface soil was collected at a total of 60 background locations samples. In many cases, the background concentration of the COPEC was above the preliminary ecological RG (e.g., aluminum, iron). EPA does not require cleanup to below background levels.

With establishment of the environmental medium of concern (soil), identification of the COPECs and determination of surface soil background concentrations, an analysis was performed in Section 2.5 of the Feasibility Study on the geographic co-location of human health COCs and ecological COPECs

<u>Cleanup to meet Ecological Direct Exposure COPECs:</u> Although there are 19 COPECs for soil listed on Tables 45, 47 and 49, analyses of the Phase I and Phase II soil datasets (surface soil only) has shown that many of the COPECs are not significant because they are not found above their preliminary remedial goal or soil background concentration while other have been detected in few of the soil samples analyzed for that COPEC (low frequency of occurence). The analyses of the Phase I and Phase II soil datasets have shown that lead, mercury and zinc to be the most significant COPECs in soil. The evaluation of the concentrations of lead, mercury and zinc in relation to ecological risk indicates that the vast majority of samples exceeding the preliminary RG for lead, mercury and zinc (or background concentrations if background is higher than the respective cleanup level) are already set for remediation for other reasons (e.g., residential soil greater than 400 ppm lead). In other words, the remediation decisions based on residential scenarios and human health appear to also address ecological risk from surface soil COPECs with respect to direct exposure.

EPA is making a risk management decision that the direct exposure ecological risk to soils in residential settings will be addressed by cleanup to satisfy human health risks. Any remaining ecological risk will be small. The remaining direct exposure ecological risk is considered insignificant for the following reasons:

- The preliminary ecological RGOs identified in the 2003 ERAs are conservative and further studies would likely increase the clean up concentrations.
- The ecological setting at Jacksonville Ash Site is not of high ecological value (i.e., it is an urban residential setting with little undisturbed land).

- A large mass of contaminants will be removed or covered to satisfy cleanup to residential human health. Removal or capping of soil to satisfy cleanup to residential human health will also remove or break most of the ecological exposure pathway.

Cleanup to meet Food Chain Exposure COPECs: Along with lead, mercury was identified as a significant food chain COPEC. The lead human health cleanup number is equivalent to the lead ecological preliminary RG, so the lead ecological problem will be addressed concurrently with the lead cleanup for human health. The ecological cleanup level for mercury are lower than respective human health values.

Analyses of the Phase I and Phase II soil datasets (surface soil only) in relation to ecological risk indicates that the vast majority of samples exceeding the preliminary ecological RG for mercury (or background concentrations if background is higher than the respective ecological cleanup level) are already set for remediation for other reasons (e.g., residential soil greater than 400 ppm lead). In other words, the remediation decisions based on residential scenarios and human health appear to also address ecological risk from surface soil COPECs with respect to food chain exposures.

EPA is making a risk management decision that the food chain ecological risk to soils in residential settings will be addressed by cleanup to satisfy human health risks. Any remaining ecological risk will be small. The remaining food chain ecological risk is considered insignificant for the following reasons:

- The preliminary ecological RGOs identified in the 2003 ERAs are conservative and further studies would likely increase the clean up concentrations.
- The ecological setting at Jacksonville Ash Site is not of high ecological value (i.e., it is an urban residential setting with little undisturbed land).
- The food chain exposure is averaged over a large exposure area. A large mass of contaminants will be removed or covered to satisfy cleanup to residential human health. Removal or capping of soil to satisfy cleanup to residential human health will also remove or break most of the ecological exposure pathway.

The overall conclusion is that cleanup to satisfy the human health RGs will also provide adequate cleanup to protect ecological receptors (i.e., separate actions to address ecological risk in soil is not needed).

## 6.4 Risk Management Decision (Sediment Remediation for Ecological Cleanup)

The analytical results of sediment in McCoy's Creek (Forest Street), Hogan Creek (5th & Cleveland) and Ribauld River (Lonnie C. Miller, Sr. Park) indicate some exceedences of the preliminary ecological remedial goals, although the evaluation of background concentration of sediments in McCoy's Creek and the Ribault River do not show a significant exceedence of sediment concentrations upstream of the sites. This evaluation indicates that the sites have not significantly contaminated the sediment above levels already present in the surface water bodies. No active remediation of the creek or river sediment is required, although the banks will be stabilized to prevent erosion into the surface water bodies of ash and soil contaminated with lead above 400 mg/kg or COPECs in excess of preliminary ecological RGs.

# PART 7: DESCRIPTION OF REMEDIAL ALTERNATIVES

## 7.1 Remedial Action Objectives

Remedial Action Objectives (RAOs) are specific cleanup objectives. For example, RAOs are site-specific goals for protecting human health and the environment established based on the nature and extent of contamination, resources that are currently and potentially threatened, and the potential for human and environmental exposure.

The following RAOs have been identified for the Jacksonville Ash Site:

- Prevent human exposure to site COCs through contact, ingestion, or inhalation of soil contaminated from incinerator ash or other wastes disposed at the Jacksonville Ash Site with a carcinogenic risk greater than $1 \times 10^{-6}$ (i.e., one in a million), with a noncarcinogenic hazard index greater than 1 and lead in excess of 400 mg/kg.
- Prevent impacts to terrestrial biota from exposure to surface soils contaminated from incinerator ash disposed at the Jacksonville Ash Site and containing contaminants of potential ecological concern (COPECs) in excess of preliminary ecological Remedial Goals (RGs) and soil background concentrations.[1]
- Prevent impacts to aquatic communities and viable insectivore (insect eating) and piscivore (fish eating) communities from exposure to sediment contaminated from incinerator ash at the Jacksonville Ash Site and containing chemicals of potential ecological concern (COPECs) in excess of ecological Preliminary Remediation Goals (PRGs) and sediment background concentrations.[2]
- Control erosion and transport of soils containing visible ash, lead in excess of 400 mg/kg or COPECs in excess of preliminary ecological RGs along the banks of rivers and creek to prevent possible unacceptable risks to human health or ecological impacts.
- Place geotextile (or other membrane) topped with gravel under residential houses with open crawlspaces (that can be accessed by children) with exceedences of human health RGs to further prevent direct contact with the soil.[3]
- Institute groundwater monitoring to verify the "No Action" decision for the groundwater. CERCLA 5 year Reviews of post-remedial groundwater monitoring will be used to determine effectiveness of this site specific source removal in reducing groundwater contaminant levels and the potential for discharge to surface water. [3]

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[1] Cleanup to satisfy the human health RGs will also provide adequate cleanup to protect ecological receptors (i.e., separate actions to address ecological risk in soil is not needed).

[2] Exceedences of ecological sediment PRGs in stream sediments have been found to be similar to sediment background concentrations upstream of the sites. No active remediation of the stream sediment is required. The drainage ditches at the 5th & Cleveland site and Lonnie Miller Park are not significant aquatic habitats due to the lack of water for most of the year. These ditches will be remediated to human health soil cleanup concentrations.

[3] Geotextile with gravel in open crawlspaces and groundwater monitoring were not part of the remedies submitted in the Feasibility Study. EPA has added these RAOs in response to concerns by Florida Department of Environmental Protection and community members.

## 7.2 Remedial Goals (i.e., cleanup levels)

Remedial Goals Options (RGOs) for residential exposure to soil, developed in the 2002/2003 HHBRAs, are listed in Tables 38, 40 and 42. EPA has chosen the RGs that meet the RAOs (to achieve the risk levels of $1 \times 10^{-6}$ and HI of 1), from the RGOs developed during the HHBRA and FDEP's soil cleanup target levels (SCTLs). The Florida SCTLs for industrial scenarios were utilized as default RGs. The RGs for residential exposure to soil, industrial exposure to soil and ecological soil and sediment are in Table 51, 52, 53 and 54 respectively. These RGs were used in the Feasibility Study to direct the investigation and evaluation of possible remedial alternatives.

**TABLE 51: HUMAN HEALTH SOIL CONSTITUENTS OF CONCERN AND RESIDENTIAL RGs**

| Constituent of Concern | Soil Background (mg/kg) | Remedial Goals (mg/kg) * | RG Source |
|---|---|---|---|
| Antimony | 0.68 | 27 | FDEP Chapter 62-777 |
| Arsenic | 1.21 | 2.1 | FDEP Chapter 62-777 |
| Cadmium | 0.36 | 82 | FDEP Chapter 62-777 |
| Copper | 14.83 | 2,810 | Jacksonville Ash HHBRA |
| Lead | 84.9 | 400 | FDEP Chapter 62-777 |
| Manganese | 46.41 | 3,500 | FDEP Chapter 62-777 |
| TEQ of 2,3,7,8,-TCDD | 0.00000882 | 0.000007 | FDEP Chapter 62-777 |
| Carcinogenic Polycyclic aromatic hydrocarbons | - | 0.1 | FDEP Chapter 62-777 |
| Aroclor-1260 (C) | 0.06 | 0.5 | FDEP Chapter 62-777 |
| Aroclor-1254 (L) | 0.008 | 0.5 | FDEP Chapter 62-777 |
| Barium (F) (C) | 34.65 | 4,166 | Jacksonville Ash HHBRA |
| Nickel (L) | 3.16 | 1,433 | Jacksonville Ash HHBRA |
| Thallium (L) | 0.2 | 6.1 | FDEP Chapter 62-777 |
| Vanadium (F) | 9.29 | 491 | Jacksonville Ash HHBRA |
| Zinc (L) | 107.17 | 26,000 | FDEP Chapter 62-777 |

Notes:

COCs without notation are common to all three sites. COCs with notations as follow are specific to that site:
Forest Street (F)
5th & Cleveland (C)
Lonnie C. Miller, Sr. Park (L)

* If the background concentration for a specific constituents is above the RGs identified above, then cleanup will be to the background concentration.

- Background concentration currently not available

**TABLE 52: HUMAN HEALTH SOIL CONSTITUENTS OF CONCERN AND INDUSTRIAL RGs**

| Constituent of Concern | Remedial Goals (mg/kg) * | RG Source |
|---|---|---|
| Antimony | 370 | FDEP Chapter 62-777 |
| Arsenic | 12 | FDEP Chapter 62-777 |
| Barium | 130,000 | FDEP Chapter 62-777 |
| Cadmium | 1,700 | FDEP Chapter 62-777 |
| Copper | 89,000 | FDEP Chapter 62-777 |
| Lead | 1,400 | FDEP Chapter 62-777 |
| Manganese | 43,000 | FDEP Chapter 62-777 |
| Nickel | 35,000 | FDEP Chapter 62-777 |
| Thallium | 150 | FDEP Chapter 62-777 |
| Vanadium | 10,000 | FDEP Chapter 62-777 |
| Zinc | 630,000 | FDEP Chapter 62-777 |
| Aroclor-1260<br>Aroclor-1245 | 2.6<br>(Aroclor mixture) | FDEP Chapter 62-777 |
| Carcinogenic Polycyclic aromatic Hydrocarbons | 0.7 | FDEP Chapter 62-777 |
| TEQ of 2,3,7,8, TCDD (dioxin) | 0.00003 | FDEP Chapter 62-777 |

Notes:

*COCs without notation are common to all three sites. COCs with notations as follow are specific to that site:*
Forest Street (F)
5th & Cleveland (C)
Lonnie C. Miller, Sr. Park (L)

* If the background concentration for a specific constituents is above the RGs identified above, then cleanup will be to the background concentration.

**TABLE 53: ECOLOGICAL SOIL CONSTITUENTS OF CONCERN AND RGs**

| Constituent of Concern | Soil Background (mg/kg) | Preliminary RG (mg/kg) | RG Source |
|---|---|---|---|
| Antimony | 0.68 | 5 | Jacksonville Ash Ecological Risk Assessments (ERAs) |
| Chromium | 12.06 | 32 | Jacksonville Ash ERAs |
| Copper | 14.83 | 61 | Jacksonville Ash ERAs |
| Iron | 2,900 | 200 | Jacksonville Ash ERAs |
| Lead | 84.9 | 400 | Jacksonville Ash ERAs |
| Mercury | 0.12 | 0.012 | Jacksonville Ash ERAs |
| Zinc | 107.17 | 200 | Jacksonville Ash ERAs |
| Aluminum (F) (L) | 3,365 | 600 | Jacksonville Ash ERAs |
| Barium (C) | 34.65 | 500 | Jacksonville Ash ERAs |
| Manganese (L) | 46.41 | 500 | Jacksonville Ash ERAs |
| Nickel (L) | 3.16 | 90 | Jacksonville Ash ERAs |
| Silver (F) (L) | - | 10 | Jacksonville Ash ERAs |
| Vanadium (C) | 9.29 | 2 | Jacksonville Ash ERAs |
| Aroclor 1260 (F) | 0.06 | 0.04 | Jacksonville Ash ERAs |
| Alpha Chlordane (F) | - | 0.1 | Jacksonville Ash ERAs |
| Gamma Chlordane (F) | 0.004 | 0.1 | Jacksonville Ash ERAs |
| Dieldrin (C) (L) | 0.004 | 0.0005 | Jacksonville Ash ERAs |
| 4,4 DDT (F) (C) | 0.003 | 0.0175 | Jacksonville Ash ERAs |
| Carcinogenic Polycyclic aromatic hydrocarbons (C) | - | 5 (Sum) | Jacksonville Ash ERAs |

COCs without notation are common to all three sites. COCs with notations as follow are specific to that site:
Forest Street (F)
5th & Cleveland (C)
Lonnie C. Miller, Sr. Park (L)

* If the background concentration for a specific constituents is above the RG identified above, then cleanup will be to the background concentration.

- Background concentration not available

**TABLE 54: ECOLOGICAL SEDIMENT CONSTITUENTS OF CONCERN AND RGs**

| Constituent of Concern | Sediment Background (mg/kg) | Preliminary RG (mg/kg) | Preliminary RG (mg/kg) |
|---|---|---|---|
| Aluminum | 3,382 (F)<br>10,482 (L) | NA | Jacksonville Ash ERAs |
| Copper | - (F)<br>286 (L) | 108 | Jacksonville Ash ERAs |
| Lead | 246 (F)<br>98 (L) | 91.3 | Jacksonville Ash ERAs |
| Zinc | 4,052 (F)<br>286 (L) | 270 | Jacksonville Ash ERAs |
| TEQ of 2,3,7,8, TCDD | - | 0.000025 | Jacksonville Ash ERAs |
| Carcinogenic Polycyclic aromatic hydrocarbons | - | 14 (Sum) | Jacksonville Ash ERAs |
| Barium (C) | - | 200 | Jacksonville Ash ERAs |
| Beryllium (F) | 0.4 | 200 | Jacksonville Ash ERAs |
| Iron (C) | - | 20,000 | Jacksonville Ash ERAs |
| Mercury (C) | - | 0.49 | Jacksonville Ash ERAs |
| Silver (F) | 0.5 | 1.77 | Jacksonville Ash ERAs |
| Vanadium (F) | 14.2 | NA | Jacksonville Ash ERAs |
| Thallium (F) | 0.8 | NA | Jacksonville Ash ERAs |
| Alpha Chlordane (F) (C) | 22.4 (F) | 0.0048 | Jacksonville Ash ERAs |
| Gamma Chlordane (F) | 33.8 | 0.0048 | Jacksonville Ash ERAs |
| Dieldrin (F) | 4.8 | 0.0043 | Jacksonville Ash ERAs |
| p,p'-DDE (C) | - | 0.0675 | Jacksonville Ash ERAs |
| p,p' DDT (C) | - | 0.048 | Jacksonville Ash ERAs |
| Acetone (C) | - | 0.453 | Jacksonville Ash ERAs |
| Methyl Ethyl Ketone (C) | - | 0.137 | Jacksonville Ash ERAs |

COCs without notation are common to all three sites. COCs with notations as follow are specific to that site:
Forest Street (F)
5th & Cleveland (C)
Lonnie C. Miller, Sr. Park (L)

NA - Not available due to lack of toxicity data

* If the background concentration for a specific constituents is above the RGs identified above, then cleanup will be to the background concentration.

- Background concentration not available

## 7.3 Description of Remedial Alternatives

To meet the RAOs and RGs outlined in Parts 7.1 and 7.2, a range of remedial actions were considered in the 2005 Feasibility Study. The purpose of this screening was to identify the technologies that may be applicable for remediation of the media of concern at the Site. The primary screening of technology types[4] and process options[5] used the following factors to evaluate the state of the technology: side conditions, waste characteristics, the nature and extent of contamination, the presence of constituents that could limit the effectiveness of the technology.

Technologies and process options that remained after the primary screening were further evaluated using a qualitative comparison based on effectiveness, implementability and cost. Those technologies and process options considered infeasible based on effectiveness, implementability and cost were removed from further consideration. The remedial technologies and process options that remained after the screening were then assembled into a range of alternatives, essentially four alternatives which will be explained in the following sub-parts.

Note that remedial alternatives which require any combination of soil excavation and/or cover installation also include restoration activities (e.g., replacement of flower beds, trees, shrubs, grass, etc.). Likewise, any remedial alternatives that require excavation will also require characterization of the excavated soil to determine proper disposal (i.e., determination if the soil is hazardous or not hazardous from a disposal standpoint). In addition, the three active alternatives all include the option for temporary relocation which will be provided to eligible residents upon their request.

Each alternative is summarizes in Parts 7.3.1 through 7.3.4 of the ROD. The (F) designation is for the Forest Street Incinerator site. The (C) designation is for the 5th & Cleveland Incinerator site. The (L) designation is for the Lonnie C. Miller, Sr. Park site.

### 7.3.1 Alternative 1: No Further Action

The no action alternative is included in the evaluation as a baseline comparison with the other remedies. Under this alternative, no remedial action would be performed to control exposure to COCs exceeding the RGs. Any reduction in soil or sediment contaminant concentrations would be due to natural dispersion, attenuation, and degradation processes.

| | |
|---|---|
| Capital Cost: | $0 (F) |
| | $0 (C) |
| | $0 (L) |
| Total All Three Sites: | **$0** |

[4] For example, in situ biological treatment, consolidation, physical treatment, excavation, administrative controls, engineered caps, etc.

[5] For example, landfarming, onsite consolidation, stabilization/solidification, excavation, city ordinances, asphalt, etc.

| | |
|---|---|
| Average Annual O&M Cost: | $5,200 (F) |
| (50 Years of O&M) | $5,200 (C) |
| | $5,200 (L) |
| Total All Three Sites: | **$15,6000** |

| | |
|---|---|
| Total Present Worth: | $70,000 (F) |
| (7% Discount Rate) | $70,000 (C) |
| | $70,000 (L) |
| Total All Three Sites: | **$210,000** |

### 7.3.2 Alternative 2: Soil Cover with Excavation and Offsite Disposal

The remedial objectives would be met by Alternative 2 primarily by providing a 0.5 foot cover of uncontaminated soil over all parcels and areas exceeding RGs. This prevents direct contact, ingestion or inhalation of surficial soils by residents while also preventing impacts to terrestrial biota. Some excavation would be needed to allow for placement of the soil cover without creating storm water drainage problems or surface grade problems with fixed surface features or structures. Exposure to subsurface soils is addressed through administrative notices and restrictions on excavation of subsurface soil. Soil below existing structures and roadways would not be removed.

Erosion of soils and ash exceeding ecological RGs is also prevented in this alternative through stabilization of the banks of McCoy's Creek, Ribault River and Hogan Creek. Stream banks would be cleared of vegetation and banks judged to have an excessive slope would be cut back. Erosion control matting would be placed, cover soil added and a new grass cover established on the sideslopes. An option for providing at least two feet of clean soil between the bank stabilization measures and the ash/soil contamination would be also considered. Acceptable side slopes and other design elements for bank stabilization will be determined in remedial design by professional engineers.

The main components of Alternative 2 are as follows:

- Soil cover with excavation where required and offsite disposal
- Solidification/stabilization for disposal pursuant to RCRA treatment standards requirements at 40 CFR §268
- Creek and river bank stabilization
- Administrative notices and restrictions (i.e., Institutional Controls)

The estimated times to complete Alternative 2 are 20 months for Forest Street, 34 months for 5th & Cleveland and 12 months for Lonnie C. Miller, Sr. Park.

| | |
|---|---|
| Capital Cost: | $12,800,000(F) |
| | $20,900,000 (C) |
| | $8,000,000 (L) |
| Total All Three Sites: | **$41,700,000** |

| | |
|---|---|
| Average Annual O&M Cost: | $31,000 (F) |
| (50 Years of O&M) | $38,000 (C) |
| | $77,000 (L) |
| Total All Three Sites: | **$146,000** |
| | |
| Total Present Worth: | $13,200,000 (F) |
| (7% Discount Rate) | $21,400,000 (C) |
| | $9,100,000 (L) |
| Total All Three Sites: | **$43,700,000** |

### 7.3.3 Alternative 3: Shallow Excavation, Offsite Disposal and Soil Cover

The RGs would be met under Alternative 3 by providing at least 2 feet of soil meeting RGs over all parcels and areas exceeding RGs and administrative notices and restrictions on excavation of subsurface soil remaining above RGs. Subsurface soil remaining above RGs will be marked by a warning mesh or fabric (i.e., snow fencing, etc.) to indicate the presence of contamination. Lonnie C. Miller, Sr. Park's Alternative 3 was broken into two subalternatives in the Feasibility Study for an evaluation of the capping of the surface soil contamination above RGs in the park with two feet of uncontaminated soil (Alternative 3a) and the removal of two feet of contaminated soil and ash before the soil cover is placed (Alternative 3b).

In residential areas, the minimum 2 feet thick of soil meeting the RGs would require excavation and offsite disposal of the shallow soil (up to 2 feet) contaminated above RGs. There are exceptions to the 2 feet removal requirement in areas adjacent to the foundation of buildings and other structures and around the base of trees. In these type of situations, less than two feet of soil could be removed to protect the structural integrity of buildings and to prevent damage to tree root systems. The removal of trees is optional and at the discretion of the owner of the property. Areas exceeding RGs below buildings, roadways, asphalt or concrete driveways and sidewalks would be considered adequately covered.

The 2 feet of soil meeting the RGs in non-residential areas (e.g., the Lonnie C. Miller, Sr., Park Alternative 3a) would be met by installation of a 2 foot thick cover, with excavation as needed for placement of the cover. In addition, in areas where removal of contaminated soil below 2 feet would result in the complete removal of all soil contamination above RGs, excavation below 2 feet would be allowed to lessen the need for Institutional Controls.

Erosion of soils and ash exceeding ecological RGs is also prevented in this alternative through stabilization of the banks of McCoy's Creek, Ribault River and Hogan Creek. Stream banks would be cleared of vegetation and banks judged to have an excessive slope would be cut back. Erosion control matting would be placed, cover soil added and a new grass cover established on the sideslopes. Acceptable side slopes and other design elements for bank stabilization will be determined in remedial design by professional engineers. An option for providing at least two feet of clean soil between the bank stabilization measures and the ash/soil contamination would be also considered.

The main components of this alternative are:

- Shallow soil excavation, offsite disposal and soil cover in residential areas
- Soil cover with excavation as needed in non-residential areas (e.g., Lonnie. C. Miller, Park Alternative 3a)
- Temporary Relocation will be provided to eligible residents upon their request
- Solidification/stabilization for disposal pursuant to RCRA treatment standards requirements at 40 CFR §268
- Creek and river bank stabilization
- Administrative notices and restrictions (i.e., Institutional Controls)

The estimated time to complete this alternative are 27 months for Forest Street, 45 months for 5th & Cleveland and 24 months (Alternative 3a) and 26 months (Alternative 3b) for Lonnie C. Miller, Sr. Park.

**Alternative 3 Including Alternative 3a for Lonnie C. Miller, Sr. Park Site**

| | |
|---|---|
| Capital Cost: | $21,600,000 (F) |
| | $29,100,000 (C) |
| | $20,100,000 (L) |
| Total All Three Sites: | **$70,800,000** |

| | |
|---|---|
| Average Annual O&M Cost: | $65,000 (F) |
| (50 Years of O&M) | $31,000 (C) |
| | $195,000 (L) |
| Total All Three Sites: | **$291,000** |

| | |
|---|---|
| Total Present Worth: | $22,500,000 (F) |
| (7% Discount Rate) | $29,500,000 (C) |
| | $22,800,000 (L) |
| Total All Three Sites: | **$74,800,000** |

**Alternative 3 Including Alternative 3b for Lonnie C. Miller, Sr. Park Site**

| | |
|---|---|
| Capital Cost: | $21,600,000 (F) |
| | $29,100,000 (C) |
| | $51,800,000 (L) |
| Total All Three Sites: | **$102,500,000** |

| | |
|---|---|
| Average Annual O&M Cost: | $65,000 (F) |
| (50 Years of O&M) | $31,000 (C) |
| | $195,000 (L) |
| Total All Three Sites: | **$291,000** |

| | |
|---|---|
| Total Present Worth: | $22,500,000 (F) |
| (7% Discount Rate) | $29,500,000 (C) |
| | $54,500,000 (L) |
| Total All Three Sites: | **$106,500,000** |

### 7.3.4 Alternative 4: Deep Excavation and Offsite Disposal

The RGs would be met under Alternative 4 (Deep Excavation and Offsite Disposal) by excavation of all soil exceeding RGs that is above the water table. Digging below the water table is deemed infeasible. Soil below existing structures and roadways would not be removed. To address subsurface soil remaining below structures, roadways, etc. and above RGs, administrative notices and restrictions on excavation would be utilized.

With removal of all soil exceeding RGs along stream banks, stabilization of the banks of creeks and rivers would not be needed.

The main components of this alternative are:

- Soil excavation and offsite disposal
- Solidification/stabilization for disposal pursuant to RCRA treatment standards requirements at 40 CFR §268
- Administrative notices and restrictions (i.e., Institutional Controls)

The estimated time to complete this alternative are 27 months for Forest Street, 45 months for 5th & Cleveland and 32 months for Lonnie C. Miller, Sr. Park.

| | |
|---|---|
| Capital Cost: | $24,200,000 (F) |
| | $29,700,000 (C) |
| | $112,200,000 (L) |
| Total All Three Sites: | **$166,100,000** |
| | |
| Average Annual O&M Cost: | $0 (F) |
| (50 Years of O&M) | $0 (C) |
| | $0 (L) |
| Total All Three Sites: | **$0** |
| | |
| Total Present Worth: | $24,200,000 (F) |
| (7% Discount Rate) | $29,700,000 (C) |
| | $112,200,000 (L) |
| Total All Three Sites: | **$166,100,000** |

## 7.4 Common Elements and Distinguishing Features of Each Alternative

All of the alternatives, except Alternative 1 (no action) include some amount of excavation, covers, solidification/stabilization (when needed), offsite disposal in an appropriate landfill, monitoring, surface regrading and re-vegetation, and Institutional Controls. The main difference between the alternatives is related to the volume of soil removed and thickness of cover. For example, Alternative 2 would remove less soil than Alternative 3 because Alternative 2 envisions a 0.5 foot cover while Alternative 3 envisions a 2 foot cover. Alternative 3 would remove less soil than Alternative 4 because Alternative 3 envisions a 2 foot cover while Alternative 4 would remove all of the contaminated soil above the water table.

A similarity is that all of the remedial alternatives (except Alternative 1) require a combination of soil excavation and/or cover installation, which would necessitate restoration activities (e.g., post-excavation replacement of flower beds, trees, shurbs, grass, etc.). Likewise, Alternatives 2, 3 and 4 include offsite disposal of excavated soil; hence, these alternatives would also require characterization of the excavated soil to determine proper disposal (i.e., determine if the soil is hazardous from a disposal standpoint and in need of treatment). As more soil is removed, there is a greater chance that more soil would be found to be hazardous waste (i.e., fail TCLP) and hence require more stabilization/solidification pursuant to RCRA treatment standards requirements at 40 CFR §268.

All of the alternatives (except Alternative 1) include Institutional Controls. A small difference between the alternatives is related to the amount of Institutional Controls necessary due to the amount of soil removed envisioned for removal. In general, as the volume of soil removed increases, less area will remain contaminated and in need of Institutional Controls. However, even if all of the contaminated soil in the yards is removed, contamination under houses, roads, driveways will remain and need Institutional Controls.

### 7.5 Expected Outcomes of Each Alternative

The No Action Alternative would leave the Site presenting the same risks as are currently present.

The expectation is that Alternatives 2 (Soil Cover with Excavation and Offsite Disposal), 3 (Shallow Excavation, Offsite Disposal and Soil Cover) and 4 (Deep Excavation and Offsite Disposal) would either eliminate and/or reduce or manage the risks due to contamination from the Site. However, the robustness of this elimination and/or risk management increases as the volume of soil removed increases and the thickness of clean cover increases. For example, the expectation is low that the soil cover thickness for Alternative 2 (i.e., 0.5 feet) in residential areas with remaining subsurface contamination will last over time. However, with a soil cover thickness of 2 feet (i.e., Alternative 3), more soil is available to create an incomplete pathway. In addition, Alternative 3's requirement for a 2 foot thick soil cover in residential areas would greatly increase the amount of contaminated soil removed from a particular piece of property, maybe even leading to the removal of all the contamination on a particular parcel except that which might exist under more permanent structures like houses, driveways, etc.

As previously noted, each of the alternatives would leave, at varying depths, a volume of contaminated soil which would require Institutional Controls. The expectation is that properly operating Institutional Controls will manage those digging activities which have the chance to encounter and move large volumes of contaminated subsurface soil. These Institutional Controls should function equivalently regardless of the alternative selected (i.e., regardless of the amount of soil removed or the thickness of the soil cover).

Because Alternatives 2, 3 and 4 all include removal or soil covering of at least the upper 0.5 foot of contaminated soil, the expectation is that all of these alternatives would reduce the risk to ecological receptors (i.e., terrestrial receptors) and greatly minimize, reduce or eliminate any future contaminant migration to creeks and rivers.

# PART 8: EVALUATION OF REMEDIAL ALTERNATIVES

## 8.1 Comparative Analysis of Alternatives

In this Part of the ROD, each alternative is evaluated using the nine evaluation criteria required in Section 300.430(f)(5)(i) of the NCP. Specifically, the four alternatives are compared in relation to the evaluation criteria described in Table 55 to determine which alternative best eliminates or reduces risks posed by contaminated soil.

| TABLE 55: CRITERIA FOR EVALUATING REMEDIAL ALTERNATIVES | |
|---|---|
| In selecting a preferred cleanup alternative, EPA uses the following criteria to evaluate each alternative developed in the Focused Feasibility Study (FS). | |
| *Threshold Criteria* - *The first two criteria are essential and if not met, an alternative is not considered further.* | |
| 1. | Overall Protection of Human Health and the Environment -- Degree to which alternative eliminates, reduces, or controls health and environmental threats. |
| 2. | Compliance with **Applicable or Relevant and Appropriate Requirements (ARARs)** -- Assesses compliance with Federal/State requirements. |
| *Balancing Criteria* - *The next five criteria are balancing criteria used to further evaluate all options that meet the first two criteria.* | |
| 3. | Long-Term Effectiveness -- How remedy maintains protection once cleanup goals have been met. |
| 4. | Reduction of Toxicity, Mobility, or Volume Through Treatment -- Expected performance of the treatment technologies to lessen harmful nature, movement, or amount of contaminants. |
| 5. | Implementability -- Technical feasibility and administrative ease of a remedy. |
| 6. | Short-Term Effectiveness -- Length of time for remedy to achieve protection and impact of implementing the remedy. |
| 7. | Cost -- Weighing of benefits of a remedy against the cost of implementation. |
| Modifying Criteria - The final two criteria are used to modify EPA's proposed plan after the public comment period has ended and comments from the community and the State have been received. | |
| 8. | State Acceptance -- Consideration of State's opinion of EPA's proposed plan. EPA seeks state concurrence. |
| 9. | Community Acceptance -- Consideration of public comments on proposed plan. |

The following sub-parts of this ROD profile the relative performance of each alternative against the two threshold criteria and the five balancing criteria and conclude with an opinion on which alternative compares most favorable against the criterium under consideration. The two modifying criteria are addressed in Parts 10 and 13 of the ROD.

Tables 56, 57 and 58 provides a side by side comparison of each alternative in relation to the threshold and balancing criteria.

TABLE 5-2
Detailed Evaluation of Remedial Alternatives
Forest Street Site
*Jacksonville Ash Feasibility Study, Revision 1*

| Alternative: Criterion | Alternative 1- No Further Action | Alternative 2- Soil Cover with Excavation and Offsite Disposal | Alternative 3- Shallow Excavation, Offsite Disposal, and Soil Cover | Alternative 4- Deep Excavation and Offsite Disposal |
|---|---|---|---|---|
| 1. Overall protection of human health and the environment | • The risks to residents exposed to the surface or subsurface soil for the school property area and the fenced area north of the property would continue to exceed the acceptable non cancer risk threshold (HI greater than 1) and exceed an ELCR of 1 x $10^{-4}$.<br>• Soil lead concentrations would continue to exceed the RGO of 400 mg/kg. Lead concentrations greater than this value in residential areas surrounding the school property are considered a potential public health threat, depending on the bioavailability of lead and the level of exposure pathway completeness.<br>• Land use restrictions to minimize potential exposure to subsurface soil exceeding RGOs would not be enacted. | • The soil cover, administrative restrictions and stabilization of the creek banks are protective of human health and the environment.<br>• Soil cover minimizes potential for direct contact with soil exceeding RGOs, thus preventing unacceptable risks from this exposure path.<br>• Potential for human exposure to subsurface soil will be minimized through administrative restrictions.<br>• Risk assessment concluded that a potential unacceptable risk exists from ingestion of vegetables grown in soil with lead exceeding RGOs. Excavation and backfilling with topsoil to depths of 2 feet would be necessary in areas where residents maintain vegetable gardens.<br>• Soil cover reduces risks to terrestrial biota from direct contact with contaminated soil.<br>• Erosion of soil exceeding RGOs is prevented through soil cover.<br>• Risks related to construction are manageable although dust control will be important and safe loading and transport of an estimated 14,000 trucks during the 20-month construction period will be important. | • The soil cover, removal of shallow soils exceeding RGOs in residential areas, administrative restrictions and stabilization of the creek banks are protective of human health and the environment.<br>• Soil cover minimizes potential for direct contact with soil exceeding RGOs, thus preventing unacceptable risks from this exposure path.<br>• Potential for human exposure to subsurface soil below 2 feet will be minimized through administrative restrictions.<br>• Soil cover reduces risks to terrestrial biota from direct contact with contaminated soil.<br>• Erosion of soil exceeding RGOs is prevented through soil cover.<br>• Risks related to construction are manageable although dust control will be important and safe loading and transport of an estimated 34,000 trucks during the 27-month construction period will be important. | • The excavation and offsite disposal of soils exceeding RGOs and stabilization of the creek banks are protective of human health and the environment.<br>• Direct contact risks are eliminated through removal of the soil posing unacceptable risks.<br>• Risks to terrestrial biota from direct contact with contaminated soil are nearly eliminated. Soil exceeding RGOs will remain below buildings, roadways, driveways, and sidewalks.<br>• Risks related to construction could be significant and would have to be actively managed. Dust control efforts will be important because nearly all the ash with high concentrations of lead will be excavated, loaded into trucks and transported offsite. The potential for vehicle or pedestrian accidents is much higher for this alternative because of the estimated 39,000 trucks to be loaded and driven through the surrounding neighborhoods during the 27-month construction period. |
| 2. Compliance with ARARs* | • The EPA chemical- specific ARAR of 400 mg/kg for lead would not be met by this alternative because exposure to soils containing 400 parts per million (ppm) lead could occur. | • The EPA chemical- specific ARAR of 400 mg/kg for lead would be met by this alternative.<br>• FAC 62-785 Brownfield Cleanup Criteria of a minimum of 2 feet of soil meeting residential cleanup criteria would not be met. However this regulation is a TBC and is not required to be met for the Jacksonville Ash Site.<br>• RCRA requirements for disposal of contaminated soil would be met. Specifically, excavated soil would be tested for TCLP lead and the soil would be treated to levels below the TCLP limit of 5 mg/L. LDRs for contaminated soil (the higher of 90% reduction in constituent concentrations or 10 x UTS) would also be met prior to landfilling the soil as a solid waste.<br>• Regulations requiring control of erosion and particulate emissions during construction activities would be met.<br>• Construction activities along the banks of McCoy Creek would be conducted in a manner that minimizes impacts to aquatic habitats. | • The EPA chemical-specific ARAR of 400 mg/kg for lead would be met by this alternative<br>• RCRA requirements for disposal of contaminated soil would be met. Specifically, excavated soil would be tested for TCLP lead and the soil would be treated to levels below the TCLP limit of 5 mg/l. LDRs for contaminated soil (the higher of 90% reduction in constituent concentrations or 10 x UTS) would also be met prior to landfilling the soil as a solid waste.<br>• Regulations requiring control of erosion and particulate emissions during construction activities would be met.<br>• Construction activities along the banks of McCoy Creek would be conducted in a manner that minimizes impacts to aquatic habitats. | • The EPA chemical-specific ARAR of 400 mg/kg for lead would be met by this alternative.<br>• RCRA requirements for disposal of contaminated soil would be met. Specifically, excavated soil would be tested for TCLP lead and the soil would be treated to levels below the TCLP limit of 5 mg/L. LDRs for contaminated soil (the higher of 90% reduction in constituent concentrations or 10 x UTS) would also be met prior to landfilling the soil as a solid waste.<br>• Regulations requiring control of erosion and particulate emissions during construction activities would be met.<br>• Construction activities along the banks of McCoy Creek would be conducted in a manner that minimizes impacts to aquatic habitats. |
| 3 Long-term effectiveness and permanence | | | | |
| (a) Magnitude of residual risks | • No significant change in risk because no action taken.<br>• Volume of soil exceeding RGOs is 227,000 $yd^3$. | • The soil cover prevents risks related to direct contact with surficial soils. Residual direct contact risks exceeding acceptable levels however would occur if subsurface soil from resident excavations was spread on the surface where long-term exposure to the soil could occur. Based on the risk assessment results for exposure to subsurface site soil, these risks would be a HI of 538 and an ELCR of 5.3 x $10^{-4}$. In addition lead concentrations greater than 400 mg/kg would occur if subsurface soil was spread on the surface. This presents a potential public health threat, depending on the bioavailability of lead and the level of exposure pathway completeness.<br>• Residual volume of soil exceeding RGOs is 164,000 $yd^3$.<br>• Potential unacceptable risks would occur if vegetables were grown in areas where lead exceeds RGOs in the root zone of the plants. | • The soil cover prevents risks related to direct contact with surficial soils. Residual direct contact risks exceeding acceptable levels however would occur if subsurface soil was spread on the surface where long-term exposure to the soil could occur. Based on the risk assessment results for exposure to subsurface soil, these risks would be a HI of 538 and an ELCR of 5.3 x $10^{-4}$. In addition, lead concentrations greater than 400 mg/kg would occur if subsurface soil was spread on the surface. This presents a potential public health threat, depending on the bioavailability of lead and the level of exposure pathway completeness<br>• Residual volume of soil exceeding RGOs is 96,000 $yd^3$. | • Residual risks related to direct contact would remain only if soils exceeding RGOs from below buildings, roadways, driveways and sidewalks are excavated and spread on the surface. Based on the risk assessment results for exposure to subsurface soil, these risks would be a HI of 538 and an ELCR of 5.3 x $10^{-4}$. In addition, a potential public health threat from exposure to lead concentrations greater than 400 mg/kg would occur if subsurface soil was spread on the surface.<br>• Residual volume of soil exceeding RGOs (i.e. below buildings, roadways, driveways and sidewalks) is 78,000 $yd^3$. |

ROD Table 56



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